identiFINDER® R300

Digital Handheld Gamma Spectrometer with Radionuclide Identification

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Chapter 1

Welcome

This chapter offers introductory information about this manual, some important advice for your safety and that of the instrument, and a general overview of the FLIR identiFINDER R300 and its accessories.

1.1 Conventions Used in This Document

This document uses the following conventions to signify various kinds of text.

Ordinary Text
: looks like this, sometimes **bold** or *italics* is used for emphasis.

`Constant Width`
: is used for URLs, file names, path names, text you have to enter somewhere.

Information about danger for yourself, an instrument, or data.

Information you should carefully consider before proceeding.

Additional information you should pay attention to.

A tip suggests commands or procedures for advanced usage. You might skip tips on your first pass through this document.

Information related to particular variants of the product.

The path to a command or setting in the FLIR identiFINDER R300 menu hierarchy or the web interface, respectively, is displayed at the beginning of appropriate sections as shown in the following examples:

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Identification Options (p. 103) ➤ Identification Settings

Settings (p. 180) ➤ General (p. 184) ➤ Identification

If you read this manual as a PDF document, you can click cross references, items in the table of contents, links into the Internet or similar to immediately view the designated item.

1.2 Safety Warnings

The FLIR identiFINDER R300 is designed for outdoor use. When operated in accordance with the operating instructions, it should not present any hazard to the operator.

The housing is essential to the integrity and safe operation of the instrument. Under no circumstances should the housing be tampered with, penetrated, or otherwise removed except for normal access to the external connectors (see chapter 7, p. 167 and 11, p. 229).

The FLIR identiFINDER R300 is not certified for use in explosive environments.

The power adapter is connected to line power. Normal care in handling such a line power device should be exercised. In particular this unit should not be connected to line power if it is wet.

The nature of the application is such that objects being surveyed with the FLIR identiFINDER R300 could emit radioactive radiation with hazardous intensity.

1.3 Before First Use

We recommend charging the batteries of the FLIR identiFINDER R300 after unpacking (11.2, p. 230) prior to first time use.

This is a good time to get familiar with the FLIR identiFINDER R300 by reading this manual.

Please read at least the rest of this chapter and those on basic operation (chapters 2, p. 27 and 3, p. 69) before starting to experiment with the FLIR identiFINDER R300.

Chapter 2, p. 27 explains the principles of operating the FLIR identiFINDER R300 to get you prepared for a typical survey you will be guided through in chapter 3, p. 69.

The fundamental modes of operation of the FLIR identiFINDER R300 are detailed in chapter 4, p. 85, followed by explanations of the FLIR identiFINDER R300 alarms in chapter 5, p. 97.

A detailed reference on all the commands is given in chapter 6, p. 103, which you should read to know about all the features and possibilities in case you need them.

Chapter 7, p. 167 explains how to setup the connection of the FLIR identiFINDER R300 to a local computer. The web interface for monitoring, configuring and transferring data is detailed in chapter 8, p. 179.

The setup for sending data to a remote server (reachback) is explained in chapter 9, p. 219

Chapter 11, p. 229 details the power supply for the FLIR identiFINDER R300.

The appendix comprises specification data (Appendix A.1, p. 237), maintenance information (Appendix B, p. 255), information about the nuclides the FLIR identiFINDER R300 can identify (Appendix C, p. 259), a glossary of terms and abbreviations (Appendix D, p. 267) and, finally, an index (p. 291)

♦ The FLIR identiFINDER R300 is available in several variants (see A.1, p. 237 for detailed specifications). All variants share almost identical operating procedures and are covered in this manual. The few places where a feature of a certain variant differs from the main stream are marked accordingly in the text.

1.4 The FLIR identiFINDER R300

The FLIR identiFINDER R300 instrument, engineered and manufactured by FLIR Detection is a digital, self-contained battery-powered instrument that provides the power of advanced spectroscopy in your palm. It is part of the FLIR Detection family of instruments designed to provide critical capabilities required in a wide range of mission circumstances. Such capabilities include:

- Search for sources of gamma radiation or scan areas contaminated with gamma radionuclides
- Automatic identification of radionuclides by analysis of gamma ray spectra
- Gamma dose and dose rate measurements
- Neutron detection with count rate and accumulated counts (Available only for variants equipped with a neutron detector.)
- Semi-conductor detector for improved resolution and ruggedness

The FLIR identiFINDER R300 combines the capabilities of a Personal Radiation Detector (PRD) with the radionuclide identification capabilities of a Radio-Isotope Identification Detector (RIID) into one conveniently small package. The FLIR identiFINDER R300 utilizes the same reliable advanced technology that is deployed in the well-known identiFINDER 2 family of instruments. We offer a family of handheld products to address the various applications operators will encounter while ensuring operators will be presented with the same screens, information, and operation between all our devices.

The FLIR identiFINDER R300 is designed for the survey of objects ranging from small packages to large objects such as freight containers to search for illicit trafficking of radioactive material, to scan containers for radiation leaks, to monitor medical waste or scrap metal, you name it. It will detect and identify radioactive materials. If the type or quantity of radioactive material exceeds pre-set alarm levels then this information will be provided to you.

In particular, the FLIR identiFINDER R300 will identify threat objects. A threat object is defined as radioactive material whose signature is consistent with that of material that could be used for terrorist purposes. Threat materials are usually those used in a nuclear explosive device or which could be used in Radiological Dispersive Devices (“Dirty” bombs).

The FLIR identiFINDER R300 incorporates advanced physics algorithms that allow any user to make highly sophisticated scientific measurements. The two button interface and simple menu structure were designed so that it can be operated with minimal training. The high degree of automation allows for successful operation even in distracting and hostile environments. The instrument is very robust and stable even in the most demanding conditions and can be operated successfully with only a few buttons.

Outstanding features are:

- Large Cadmium Zinc Telluride (CZT) detector for fast and accurate identification
- Brilliant color display with 320×240 pixels, that is easy to read in all lighting conditions
- Large database capacity for more than half a million spectra or other data
- GPS receiver to log incident locations
- Wired communication via standard USB interface
- Wireless communication via Bluetooth for reachback
- Web interface for monitoring and configuration of the instrument without additional PC software

… and many more. See A.1, p. 237 for the complete specifications.

1.5 Unpacking and Identifying Accessories

The FLIR identiFINDER R300 is available in several variants (see A.1, p. 237) which are shipped with their accessories (Figure 1, p. 21) in a sturdy case (Figure 2, p. 22)

Ⓐ FLIR identiFINDER R300 instrument with rubber boot and wrist strap string

Ⓑ Wrist Strap (Lanyard)

Ⓒ Holster

Figure 1. The FLIR identiFINDER R300 with accessories

(D) Wall power adapter with USB-A receptacle

(E) International adapters for power adapter (US, Euro, UK)

(F) Car power adapter with USB-A receptacle

(G) Mini USB-B to USB-A cable for connection to local computer or power adapter (USB 2.0)

(H) CD-ROM with manual and drivers

(I) Pelican case

Review the parts and components received. In the event that a component cannot be located contact the appropriate support organization (see Chapter B.4, p. 257).

A name plate (Figure 3, p. 23) is attached to the rear side of the instrument. It lists the type of instrument, the serial number and other important information.

You might want to remember the serial number. It is sometimes used to identify the FLIR identiFINDER R300 in a computer network.

After the initial charge, the FLIR identiFINDER R300 is ready for use.

Figure 2. The FLIR identiFINDER R300 with accessories in Pelican carrying case

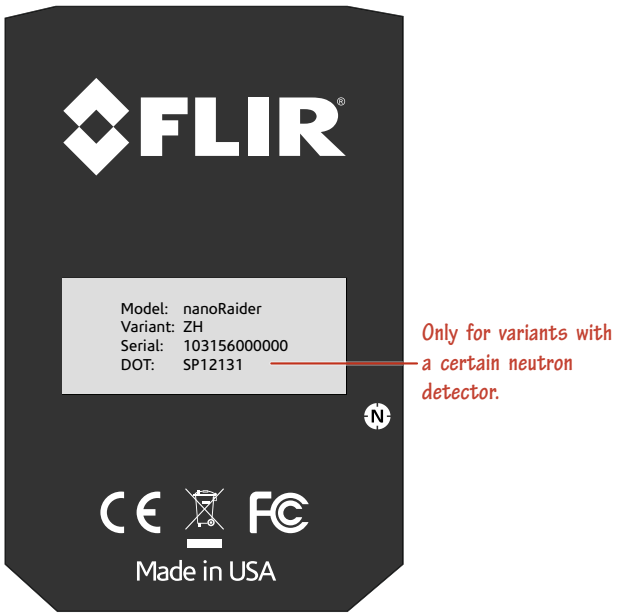

Figure 3. Name plate at the rear side of the FLIR identiFINDER R300

1.6 Instrument Description and Application Overview

The FLIR identiFINDER R300 can be described as a small but powerful computer with keyboard and LCD screen further equipped with dedicated detectors for gamma and neutron radiation plus some auxiliary sensors such as a receiver for the NAVSTAR global positioning system (GPS). All data acquired by the sensors are recorded, processed and evaluated by a sophisticated software that discriminates innocent from threatening radiation even when operated by personnel with minimal training.

A general outline of the FLIR identiFINDER R300's functional elements is given in Figure 4, p. 25, while Figure 5, p. 26 helps to identify and locate the various components of the instrument.

- A microcomputer shown in the center of Figure 4, p. 25 is the central element of the FLIR identiFINDER R300. It is connected to various peripherals for input, output, and communication.
- Green circles in the upper left part of Figure 4, p. 25 represent input peripherals including the keys and, most prominently, the sensors for radioactive radiation:
  - A cadmium zinc telluride (CZT, CdZnTe) semiconductor crystal to record gamma radiation spectra
  - Two CdZnTe crystals for dose rate measurements
  - A ^{3}He detector for neutron radiation (optional)
- Output of the FLIR identiFINDER R300 is directed mainly to the screen plus some status lights, a beeper, and a vibrator symbolized by blue circles in Figure 4, p. 25.
- The light gray circles in Figure 4, p. 25 represent elements accessible from the outside of the instrument like the communication facilities.

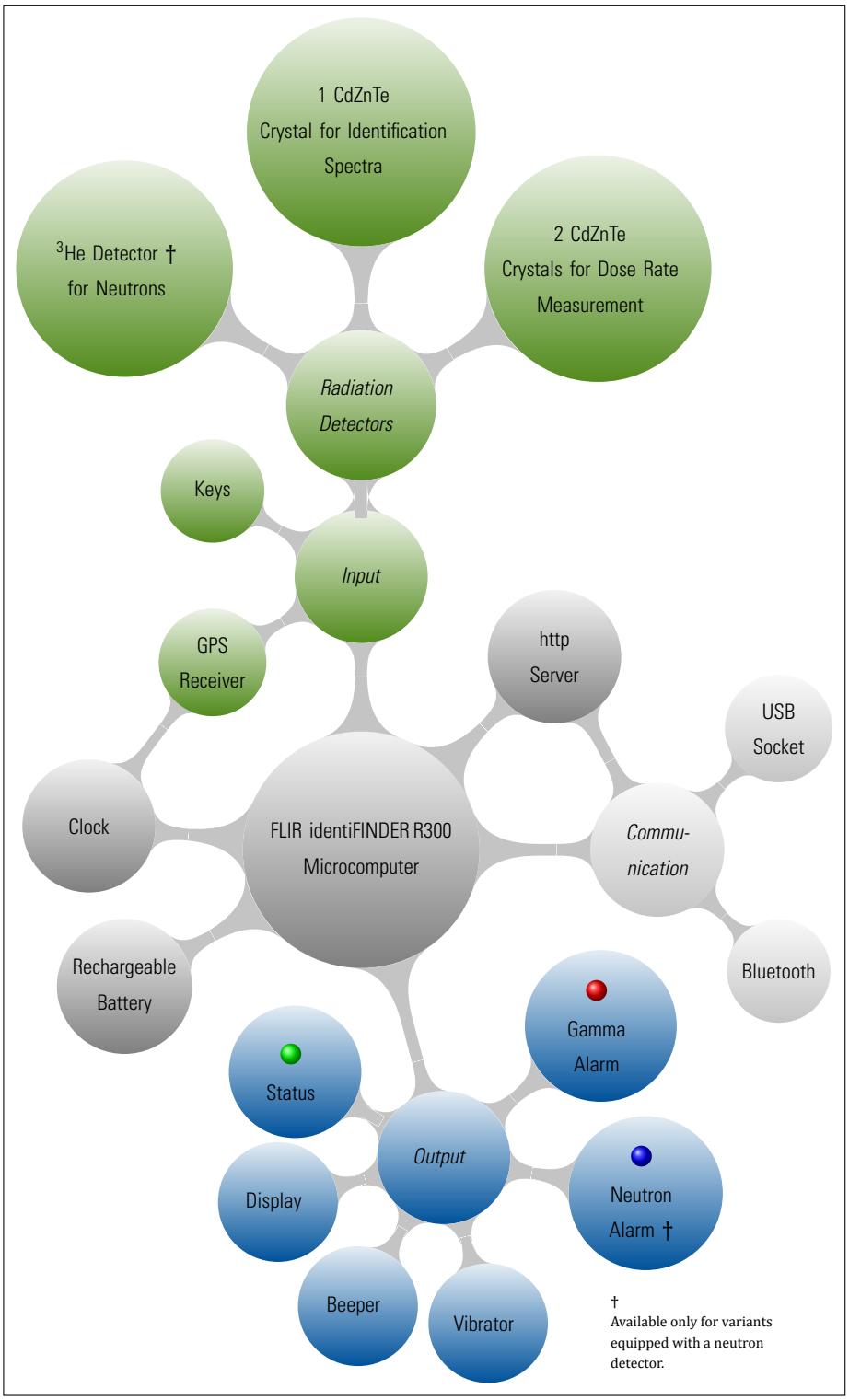

Figure 4. Functional units of the FLIR identiFINDER R300 (see text).

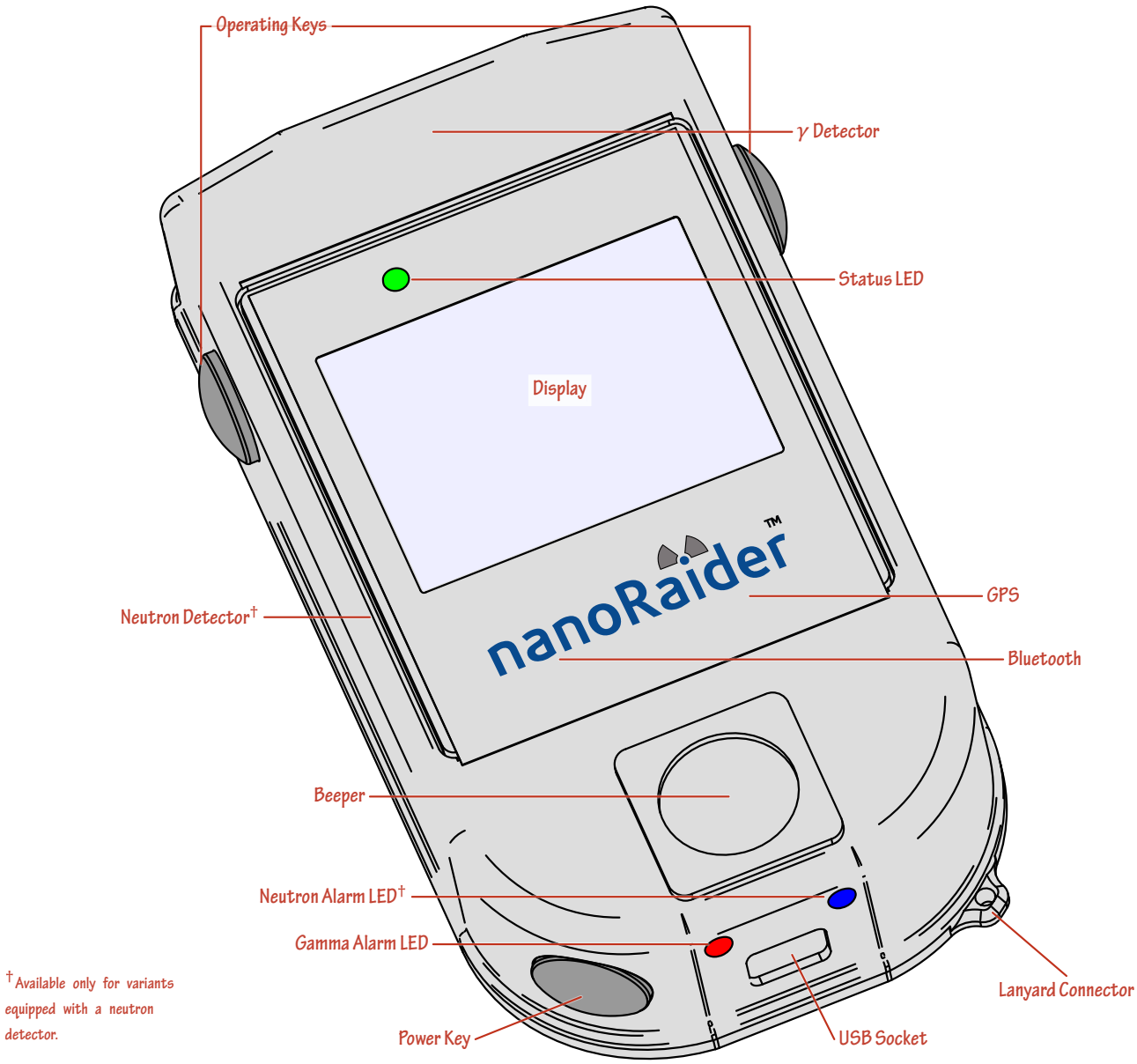

Figure 5. Map of the FLIR identiFINDER R300 components

Chapter 2

Operating the FLIR identiFINDER R300

The FLIR identiFINDER R300 is optimized for single-handed operation (see Figure 6, p. 27). The detector should point to the object to be surveyed while you watch the display and control the instrument by pressing the keys with thumb and middle finger.

For best dose rate calculations the source must not be too close to the instrument (Figure 239, p. 242).

Figure 6. Surveying an object with the FLIR identiFINDER R300.

The FLIR identiFINDER R300 display consists of a color LCD screen and several LEDs (Figure 7, p. 28).

The fundamental principle of operation is to choose one of the available options and then execute the associated command or function by pressing a key.

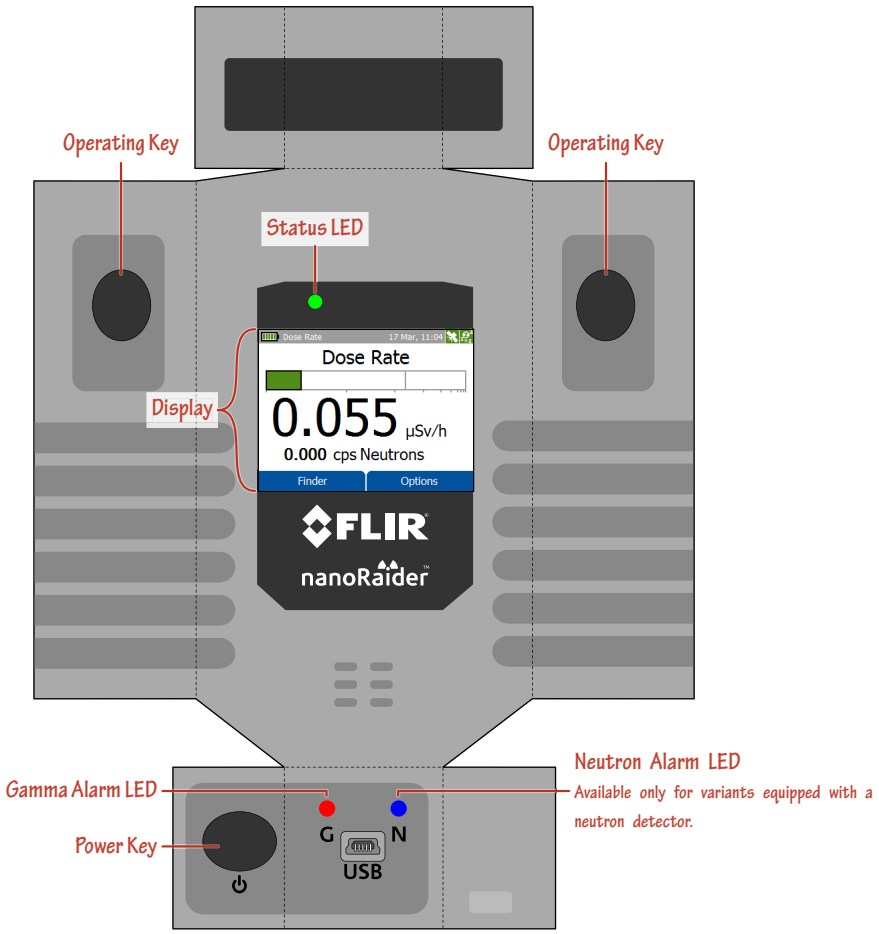

Figure 7. Papercraft model of the FLIR identiFINDER R300 with operating elements: Display, LEDs and keys.

2.1 The FLIR identiFINDER R300 Display

The FLIR identiFINDER R300 display (Figure 7, p. 28) is a color LCD screen divided into three principle areas (Figure 8, p. 29):

TOP: Title and Status Bar

This area contains a brief title of the currently performed operation or the current mode the instrument is switched to and some icons representing the status of several components of the instrument.

When a warning or an alarm is raised, the alarm information is shown alternating with the title (see, for example, Figure 100, p. 98).

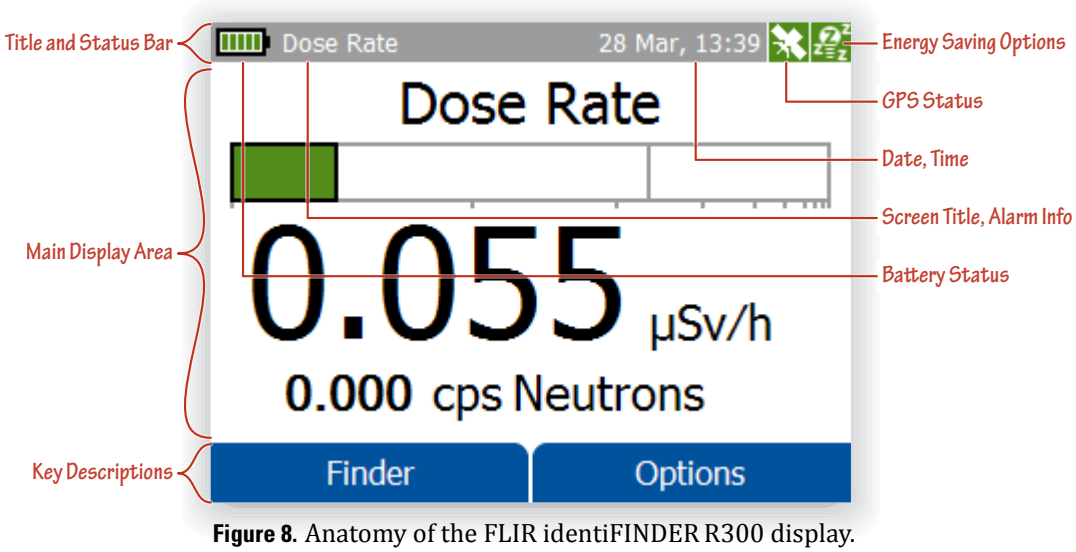

Figure 8. Anatomy of the FLIR identiFINDER R300 display.

The **power indicator** and the **title** are grouped in the left part of the bar.

Full battery

Empty or no battery

Triangles symbolize the connection to an external power supply. This information is also shown by a green LED (see 11.2, p. 230).

A segment flickers while the battery is being charged.

The current **date and time** and indicators for the **GPS receiver** and the **energy saving** options are grouped in the right part of the title bar.

19 Feb, 14:10

The current local date and time are shown as day, month, hours (24-hour notation) and minutes.

The time is supplied by the clock built into the FLIR identiFINDER R300. It uses UTC (a.k.a. "Greenwich Time") for internal purposes and for time-stamping records saved in the database, for example, spectra or identification results.

For correct values you have to ensure the correct setting of the clock and the correct specification of your local time zone (see 6.10, p. 125).

The correct time and date can be set using the GPS receiver built into the FLIR identiFINDER R300. If it is switched on (see 6.11, p. 127), it adjusts the clock to the high-precision UTC time received from the GPS satellites. All you have to specify is your local time zone (see 6.10, p. 125).

If the internal clock is completely off, for example after storing the instrument with empty batteries for a couple of weeks, you have to adjust the internal clock and specify the time zone (see 6.10, p. 125).

A one-minute countdown is shown instead of the current clock to announce the beginning of scheduled automated identification measurement (see 4.4, p. 93).

A satellite symbolizes the state of the GPS receiver.

GPS receiver is switched off (factory setting, 6.11, p. 127).

GPS receiver is switched on (6.11, p. 127) but the GPS reception is not good enough to determine the current position. Invalid coordinates, marked as such, are saved.

GPS receiver is switched on (6.11, p. 127) and the GPS reception is sufficient to determine the current position which is saved with measurement data and identification results.

A light bulb symbolizes the current energy saving options.

The FLIR identiFINDER R300 will not try to save energy because the current operation requires an active display, for example, during an identification measurement (4.3, p. 90).

The backlight of the screen will be dimmed after the timeout you specified (6.9, p. 122).

The backlight of the screen will be dimmed after the timeout you specified (6.9, p. 122) and the application software will power down half a minute later.

This mode is not used while the FLIR identiFINDER R300 is powered by an external power source.

You can wake up a sleeping system by pressing a key.

CENTER: Variable Main Display

The contents of this area vary with the current operation of the FLIR identiFINDER R300.

It shows, for example, status information after power up (Figure 55, p. 63), menus to choose commands from (Figure 13, p. 35), the strength of the observed gamma radiation (Figure 87, p. 86), or corresponding alarms (Figure 101, p. 99).

BOTTOM: Key Descriptions

The fields in this bar name the current function of each of the operating keys L R.

2.1.1 Status LEDs

Several LEDs (Figure 5, p. 26) indicate various status information.

Red

labeled “G” (short for “Gamma”) indicates dose and dose rate alarms.

Blue

labeled “N” (short for “Neutron”) indicates neutron counts and alarms.

♦ Available only for variants equipped with a neutron detector.

Green

indicates the power status (Figure 9, p. 31).

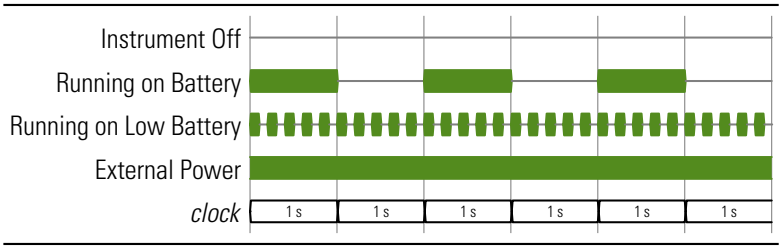

Figure 9. Signals of the status LED

You can switch off the red and blue LEDs (6.32, p. 160).

2.2 The FLIR identiFINDER R300 Keys

The FLIR identiFINDER R300 is equipped with three keys (Figure 5, p. 26 and Figure 7, p. 28).

The single key at the bottom is the power key (I). It is used to switch the instrument on and off, to cancel edit operations or return to superior menus.

The other two buttons on the L left and R right side of the instrument are the main operating keys. They change their function according to the current mode of operation of the FLIR identiFINDER R300.

For your convenience, the actual function of these keys in any given situation is displayed in the bottom part of the screen (Figure 7, p. 28). A detailed description of the keys' functions under various circumstances is given in chapter 6, p. 103.

Holding the FLIR identiFINDER R300 with your hand (Figure 10, p. 33), you can, for example, press one key with your thumb and the other one with your middle finger.

To accomodate to your handedness or your personal preferences (Figure 10, p. 33 and Figure 11, p. 34), you can swap the function of these keys (6.9, p. 122).

This document refers to the keys and their functions using the "normal" assigment and label them as L and R, respectively.

Figure 10. Right-handed operation of the FLIR identiFINDER R300 with normal key assignments

Figure 11. Left-handed operation of the FLIR identiFINDER R300 with reverse key key assigments

2.2.1 Using Command Lists

Most features of the FLIR identiFINDER R300 offer more commands than you could immediately reach with the FLIR identiFINDER R300's limited number of keys.

In these cases the special command Skip is permanently mapped to L and you can use it to cycle the available commands. If you reach the end of the list, L cycles to the start of the list.

For example, the commands to edit values are +, -, Left, Right, Accept, and Cancel (2.2.3, p. 37). You can swap these commands with Skip (Figure 12, p. 35).

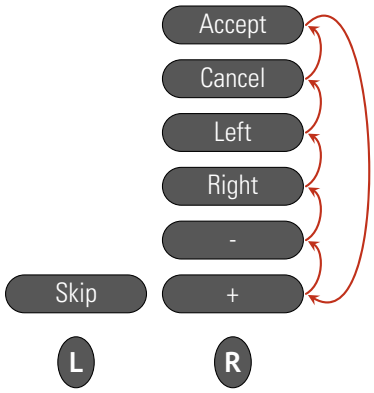

Figure 12. Skipping commands for value editing

2.2.2 Choosing from Menus

Often you have to choose an operation from a menu like, for example, the "More Options" menu shown in Figure 13, p. 35.

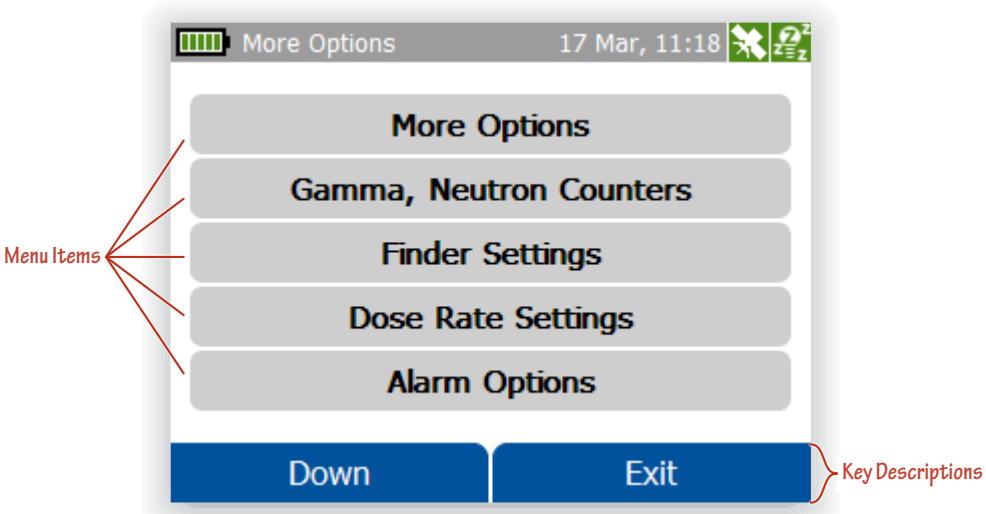

Figure 13. Choosing from a menu: Initial state without chosen item

While no item is chosen, you can press R to Exit to the superior screen.

You can choose items from the menu with the command Down mapped to the L key. The chosen item is decorated by a distinct color and symbols (Figure 14, p. 36).

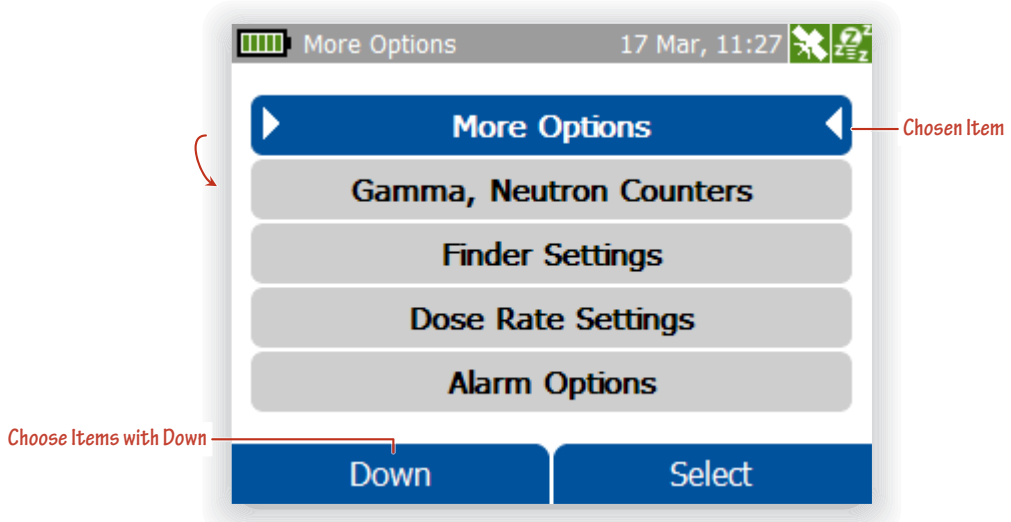

Figure 14. Choosing from a menu: Choosing the next item with Down

Press L repeatedly to choose other menu items (Figure 15, p. 36).

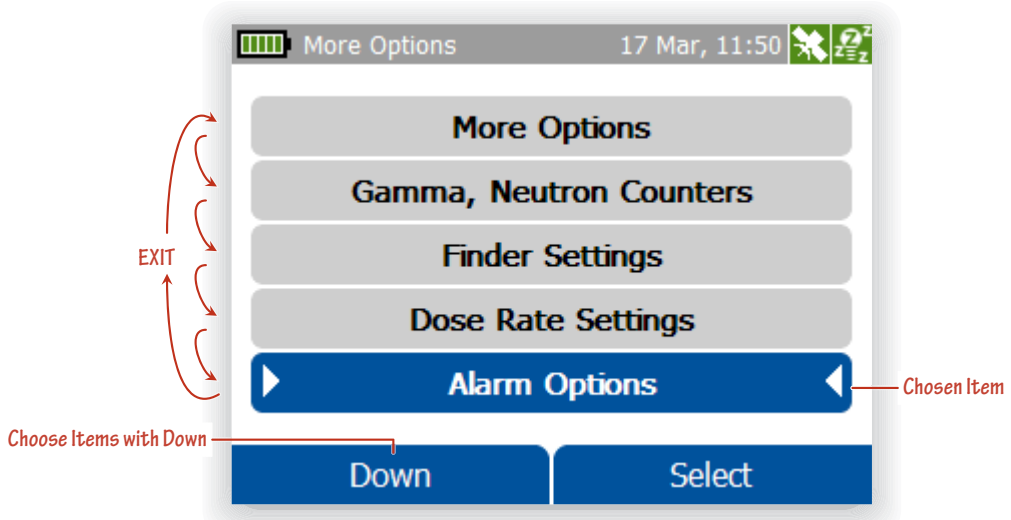

Figure 15. Choosing from a menu: Choosing other items with Down

After reaching the bottom of the menu (Figure 15, p. 36), no item will be chosen on the next press of L and Exit becomes available.

Once you have chosen the item you are interested in, you can Select the item with R. This executes the chosen command, which, in our example, opens the Advanced Options menu (Figure 16, p. 37).

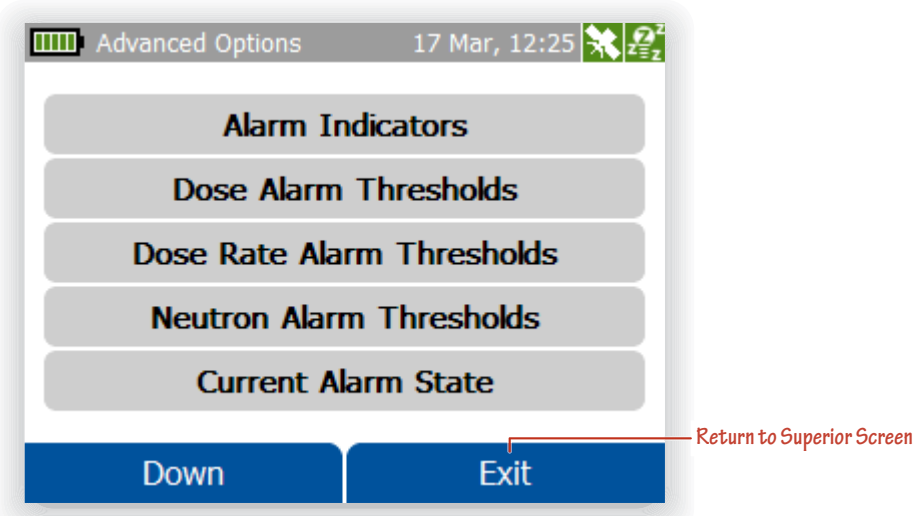

Figure 16. Choosing from a menu: After executing the command with Select

2.2.2.1 Scrolling in Menus

Some menus offer more options than the five fitting on the screen. This is indicated by scroll bars along the vertical screen edges (Figure 17, p. 37).

A position marker indicates the position of the chosen item relative to the complete list of items. Arrows at the upper and lower visible item indicate whether more items are available in that direction, respectively.

If you approach the bottom of the screen with Down mapped to the L key, the entire menu is moved up to bring the following items into view. The position markers are adjusted appropriately.

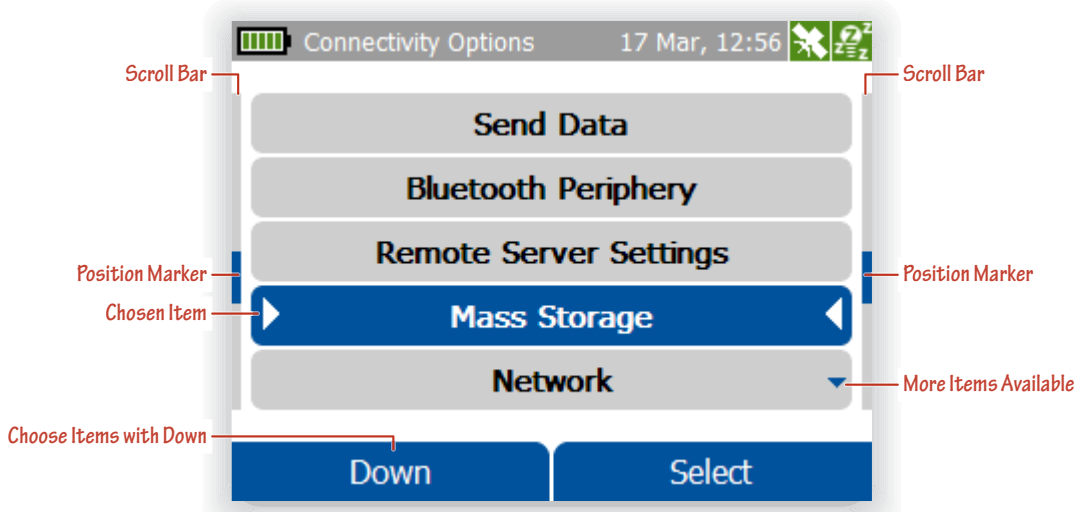

Figure 17. Choosing from a menu: Scrolling in long menus

2.2.3 Changing Values

Many settings of your FLIR identiFINDER R300 require you to choose from a list of options.

The operations are illustrated using the Display Settings as an example. Like in a menu (2.2.2, p. 35), you choose the setting you want to change with Down (Figure 18, p. 38).

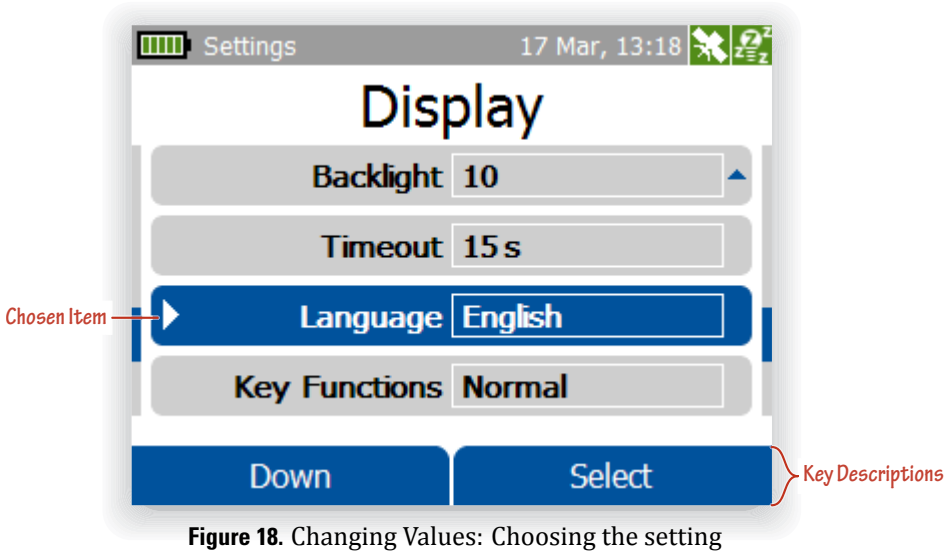

Figure 18. Changing Values: Choosing the setting

Once the desired setting is chosen, you Select it with R.

The rendering of the entry field changes (Figure 19, p. 38): a different color and two arrows indicate there is a list of values you can choose from.

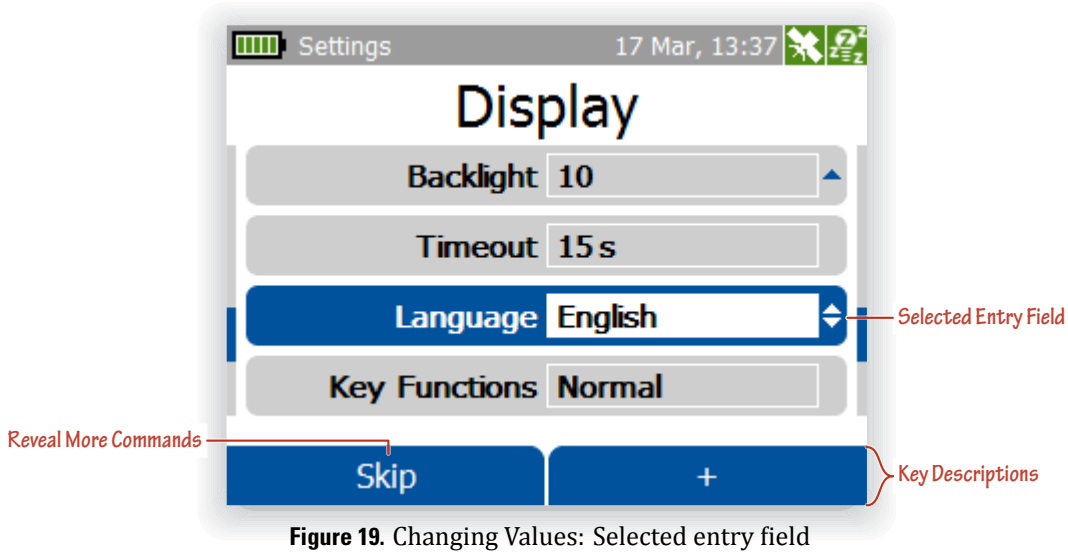

Figure 19. Changing Values: Selected entry field

Note that the keys now have other functions. You get the next item in the list with + mapped to R.

Our example is about the display language, so let's use R to change to, for example, Deutsch (German, Figure 20, p. 39).

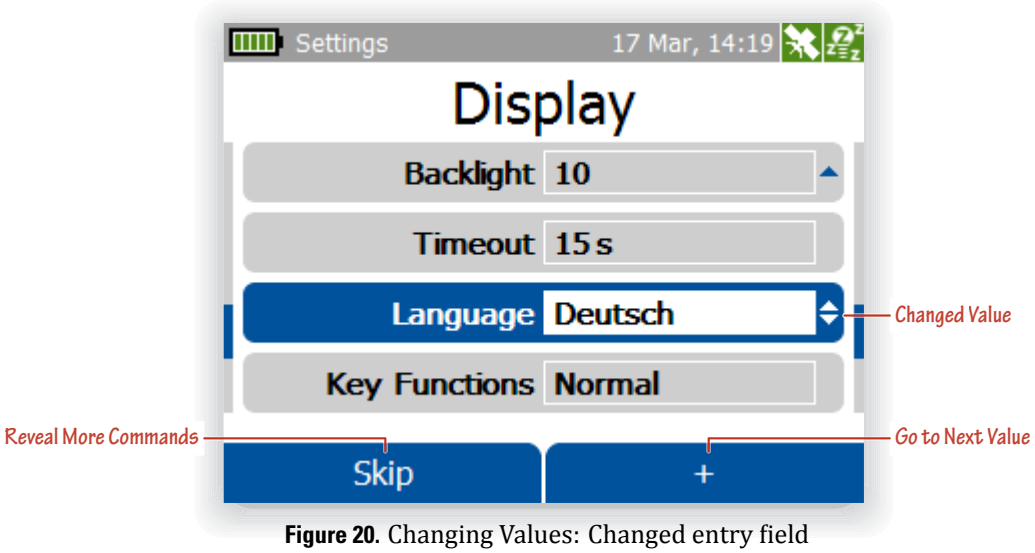

Figure 20. Changing Values: Changed entry field

The actual setting did not change yet, the screen is still displayed in English. You can choose other values with + ad lib.

To make your changes effective, you need another command which is currently inaccessible. Press Skip mapped to L to make it visible (Figure 21, p. 39).

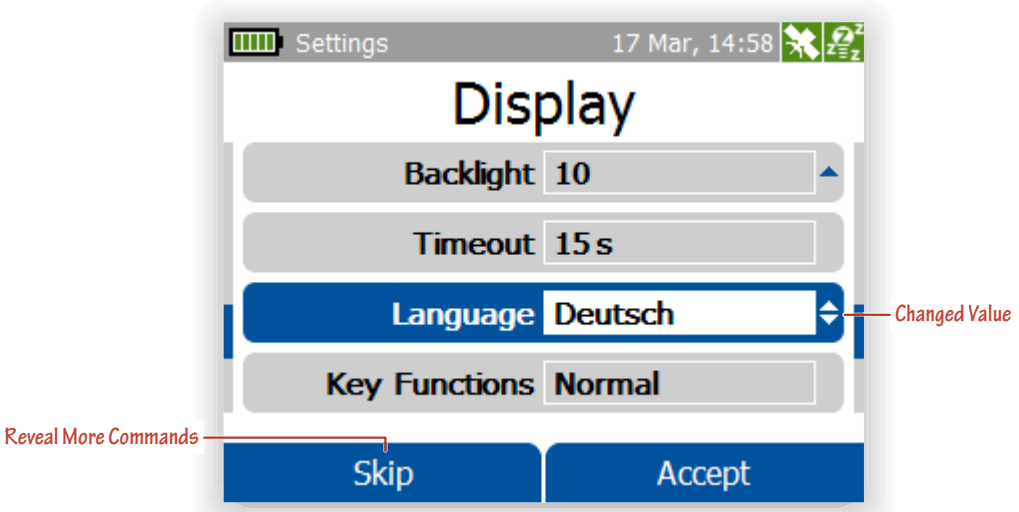

Figure 21. Changing Values: Revealing more commands

The moment you press Accept mapped to R, the new setting takes effect. In our case the screen is displayed in German (Figure 22, p. 40).

The keys' functions return to their previous state.

In case you change your mind, you can Cancel editing the value with R (Reveal the command with Skip if necessary). The value in effect before you started editing with Select will be reestablished.

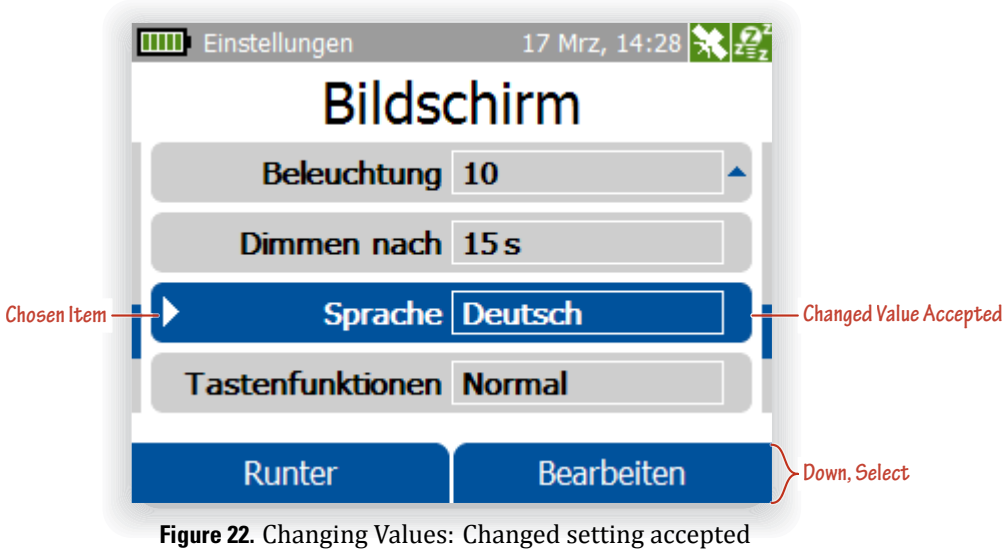

Figure 22. Changing Values: Changed setting accepted

Pressing ⏻ for a moment also cancels editing.

⚠ Do not press ⏻ for too long. That would power down your FLIR identiFINDER R300.

2.2.4 Changing Composite Values

Some values are combinations of several components. Calendar dates for example, have year, month, and day components or clock settings have hour and minute components.

Several commands (Figure 12, p. 35) are available if you Select (see 2.2.3, p. 37) such values for editing. Always one of the value's components is selected (Figure 23, p. 40), that is, editing commands are applied to this component.

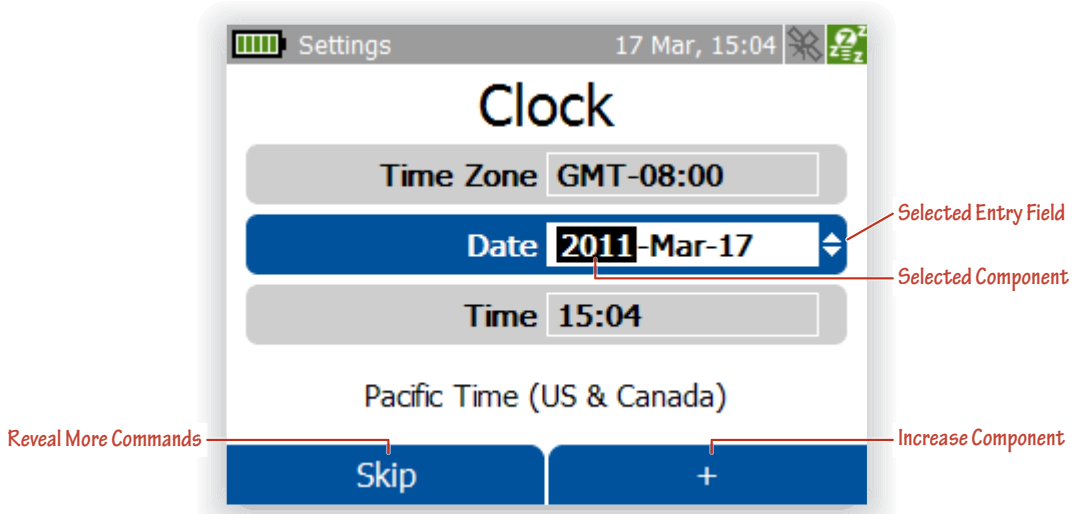

Figure 23. Changing Combined Values: Changing the selected component

You increase the component with + and decrease it with -. In the example shown here, you edit the year of the date since it is the selected component.

Now you need commands to select the other components of the value (see 2.2.1, p. 35). You can reveal them with Skip mapped to L (Figure 24, p. 41).

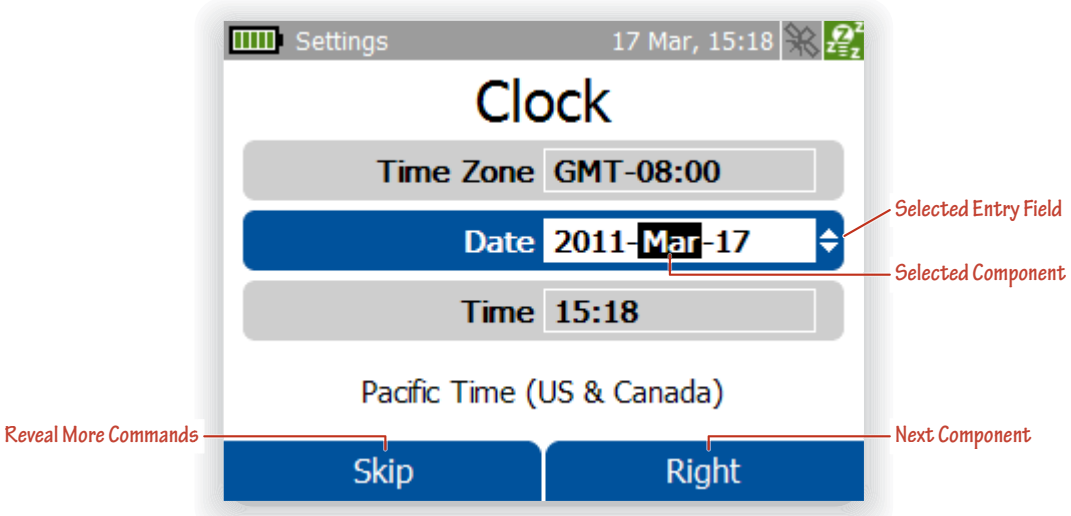

Figure 24. Changing Combined Values: Selecting components.

Press Left or Right to select the component you want to edit.

To get the commands for editing back, press Skip until + or - reappear.

After you finished editing all components, press Skip until you see the Accept command, then press R.

In case you change your mind, you can Cancel editing the value with R (Reveal the command with Skip if necessary). The value in effect before you started editing with Select will be reestablished.

Pressing I for a moment also cancels editing.

⚠ Do not press I for too long. That would power down your FLIR identiFINDER R300.

2.2.5 Changing Numerical Values

A lot of settings are numerical values, often with a immutable unit.

Several commands (Figure 12, p. 35) are available for editing numerical values. One of the number's digits is always selected (Figure 25, p. 42), that is, editing commands are applied to this digit. If you start changing a number with Select (see 2.2.3, p. 37), the rightmost (least significant) digit is selected.

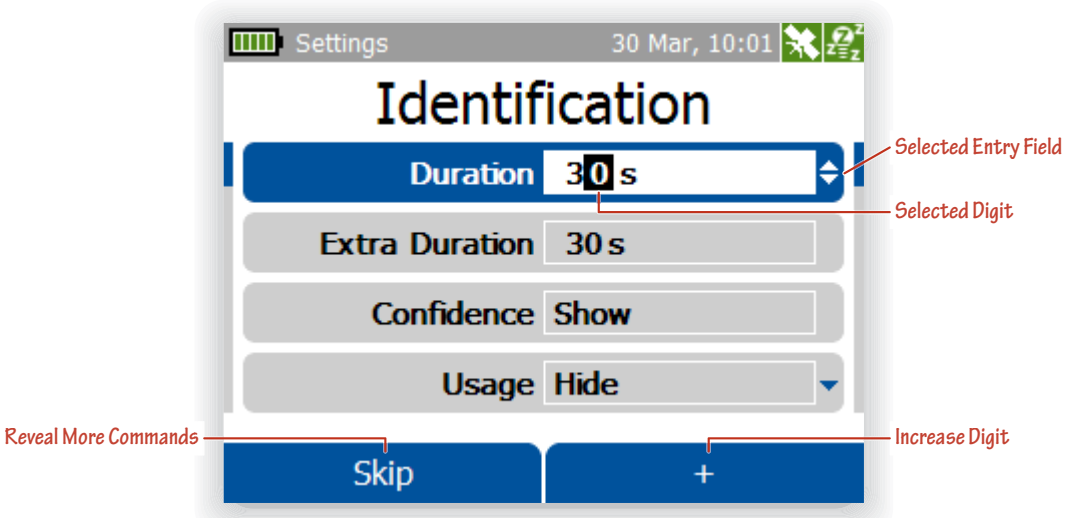

Figure 25. Changing Numerical Values: Changing the selected digit

You increase the selected digit with + and decrease it with -. If you increase the selected digit above 9 or decrease it below 0, the surrounding digits are changed appropriately.

If you want to change the number in larger or smaller increments, you can select another digit to be immediateley affected by the + and - commands. Press Skip until you see the commands Left or Right, and then use them to select the digit you want to change (Figure 26, p. 42).

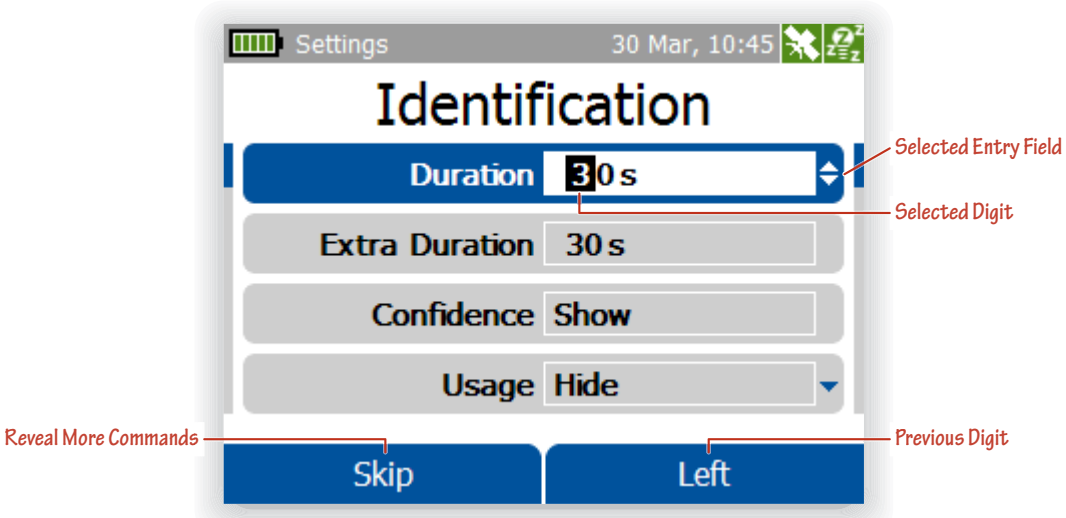

Figure 26. Changing Numerical Values: Selecting digits

To get the commands for editing back, press Skip until + and - reappear.

After you finished editing the number, press Skip until you see the Accept command, then press R.

In case you change your mind, you can Cancel editing the value with R (Reveal the command with Skip if necessary). The value in effect before you started editing with Select will be reestablished.

Pressing ⏻ for a moment also cancels editing.

⚠ Do not press ⏻ for too long. That would power down your FLIR identiFINDER R300.

2.2.6 Entering Text

Several entries consist of arbitrary text, for example the operator's name, phone numbers, or settings for Bluetooth communication to a remote server (Figure 164, p. 149). Entering and editing text with the FLIR identiFINDER R300's limited number of keys is, of course, challenging. It is similar to editing composite values as described in 2.2.4, p. 40, with every character being a component.

💡 Editing text is a lot more convenient via the FLIR identiFINDER R300's web interface (see 8, p. 179).

Several commands are available if you Select (see 2.2.3, p. 37) text values for editing. These commands are mapped to the R key. Use Skip mapped to L to cycle through the available commands (see 2.2.1, p. 35).

During text editing, exactly one character is selected (Figure 27, p. 43), that is, editing commands are applied to this character.

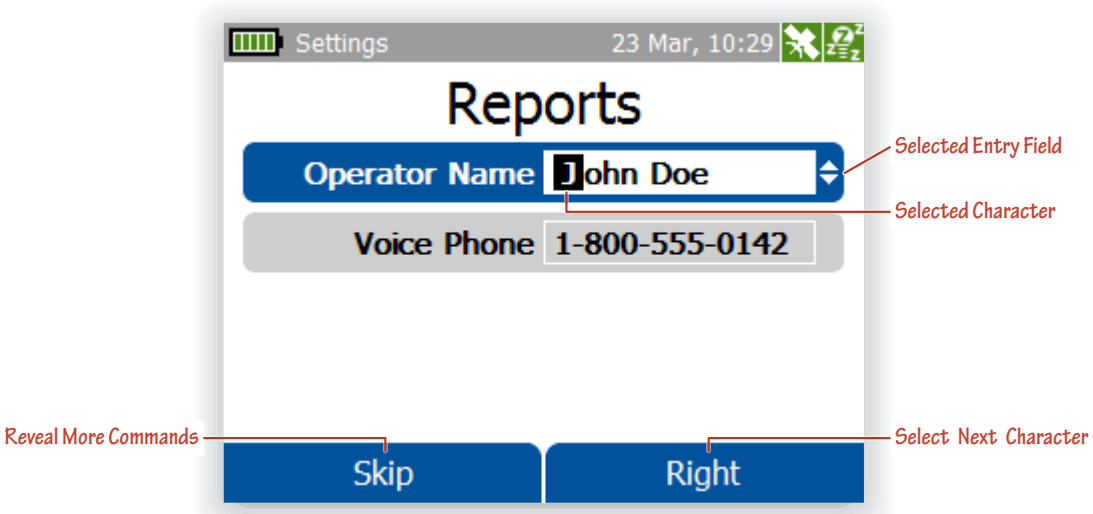

Figure 27. Editing Text: First character "J" is selected.

To select another character, use Left or Right (Figure 28, p. 44).

If you reach the left end of the text, Left does nothing. At the end of the text, however, Right moves to two additional characters (spaces) to facilitate appending another word to the text.

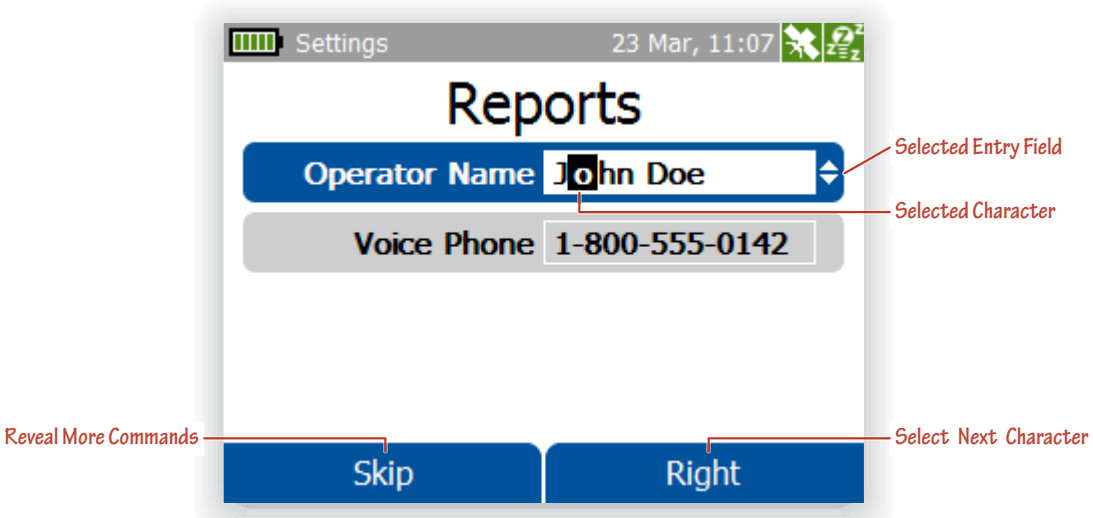

Figure 28. Editing Text: Next character to the right is selected ("o").

For the selected character (Figure 30, p. 44), you can use the commands + and - to cycle through the available characters in the sequence shown in Figure 29, p. 44.

Use the web interface (see 8, p. 179) to enter international characters like æ, î, ö, ñ, ß, ëtç.

```
!"§$%&/()[]{}=?*+#'-_@.:,;
0123456789
(Space)
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
```

Figure 29. Editing Text: Set of available characters

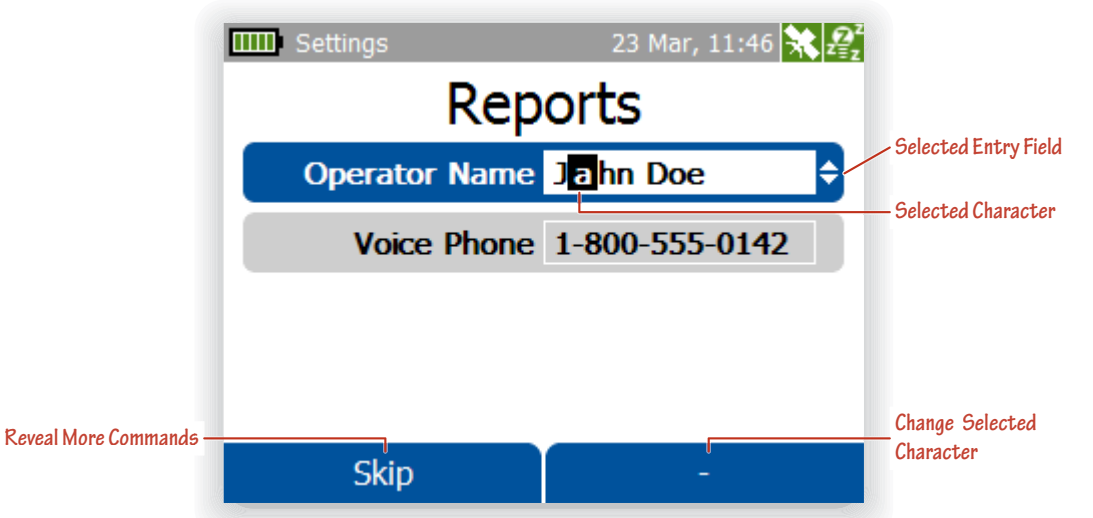

Figure 30. Editing Text: After changing the selected "o" to an "a".

To delete the selected character use Delete (Figure 31, p. 45).

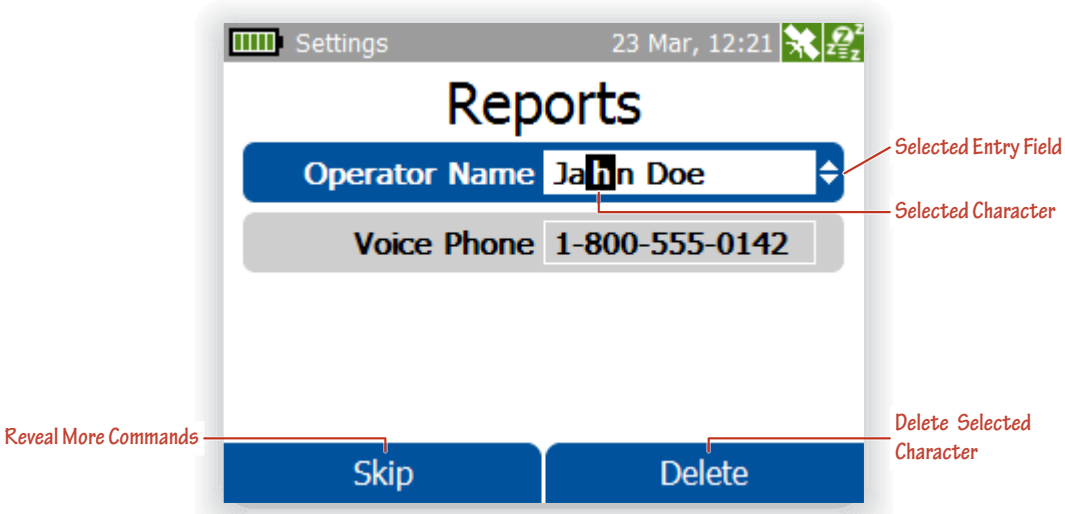

Figure 31. Editing Text: About to delete the selected character "h".

The characters from the selected one to the end of the text will be moved towards the beginning to fill the gap (Figure 32, p. 45).

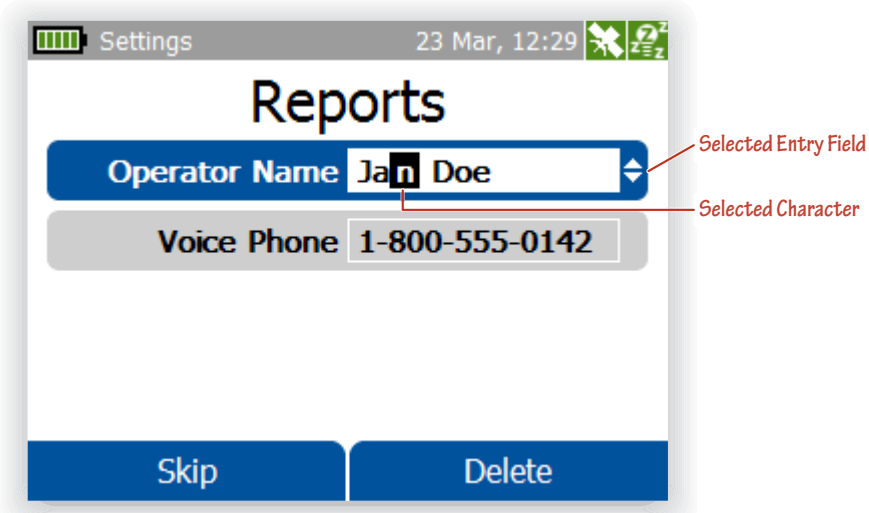

Figure 32. Editing Text: After deleting a character, the next character is selected.

To insert a character before the currently selected character, use Insert. The existing characters, including the selected one, are pushed one position towards the end of the text (Figure 33, p. 46).

After you finished editing the text, press Skip until you see the Accept command and press R (Figure 34, p. 46).

Spaces at the start or end of the text, if any, are removed from your entry.

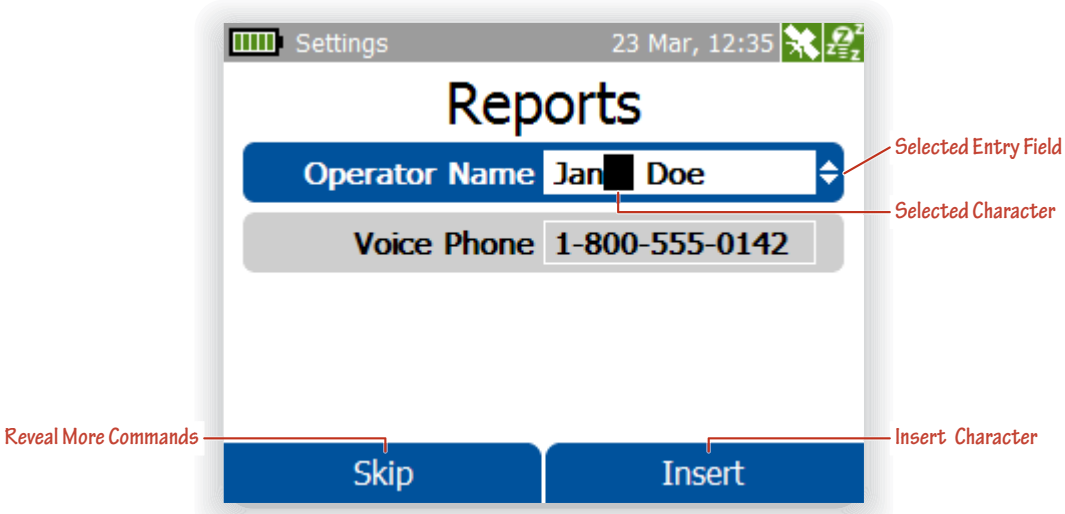

Figure 33. Editing Text: After inserting space before " Doe" for an additional character.

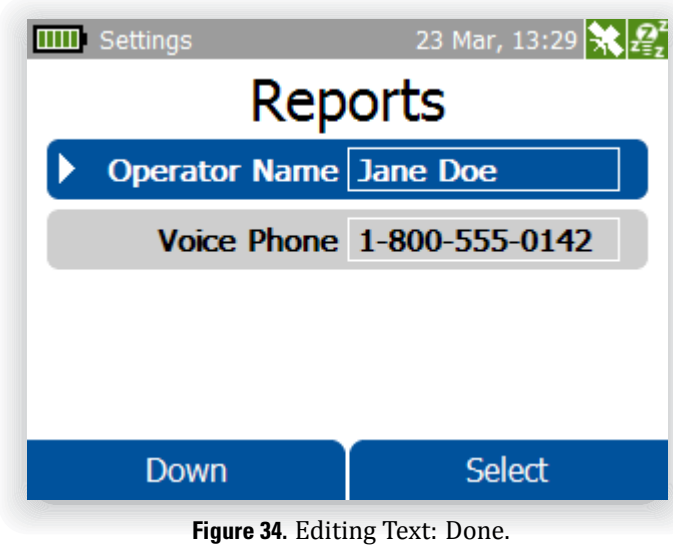

Figure 34. Editing Text: Done.

In case you change your mind, you can Cancel editing the value with R (Reveal the command with Skip if necessary). The value in effect before you started editing with Select will be reestablished.

Pressing ⏻ for a moment also cancels editing.

⚠ Do not press ⏻ for too long. That would power down your FLIR identiFINDER R300.

2.2.7 Entering the Password

If your FLIR identiFINDER R300 is protected by a password, you will have to enter it before you can access most of the options and settings menus of the instrument (Figure 35, p. 47).

If your variant comes with a factory-set password, it is LMRLMRL.

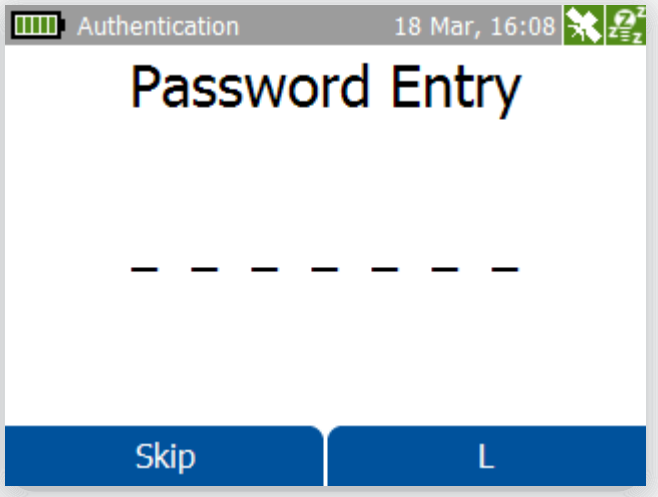

Figure 35. Entering a password to access the option menus.

For better protection against unwanted changes of the instrument characteristics, you should change the password to something else (6.12, p. 128).

If you don't need protection but want faster access to the menus, you can remove the password (6.13, p. 129).

Settings and Commands

Skip

Cycle the list of commands (see 2.2.1, p. 35).

L, M, R

Enter the password by seven presses in the correct sequence.

To cancel the password entry press ⏻ for a moment.

After the seventh entry, the key labels change (Figure 36, p. 48).

Accept

Confirm your password entry and have the instrument check your entry for correctness.

After you entered the correct password, you don't have to enter it again until you switch off the instrument.

If you enter a wrong password, you will be informed (Figure 37, p. 48). After you confirm the message with OK, the instrument will return to the mode it was in before asking for the password.

Cancel

Cancel the password entry and return without proceeding to the protected options and commands.

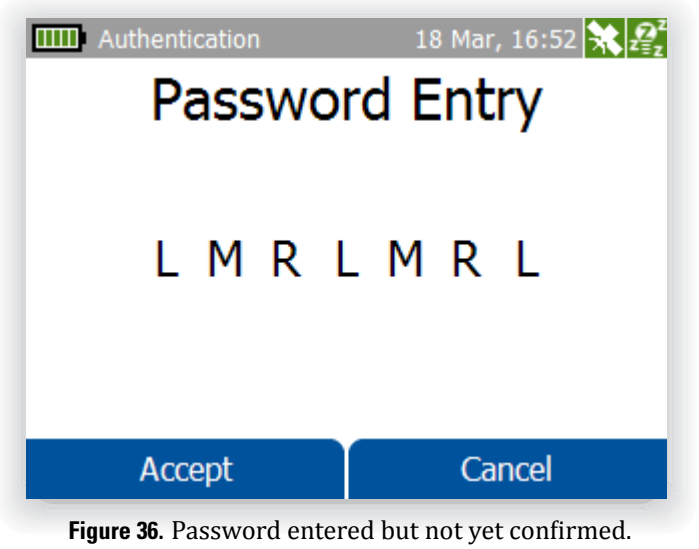

Figure 36. Password entered but not yet confirmed.

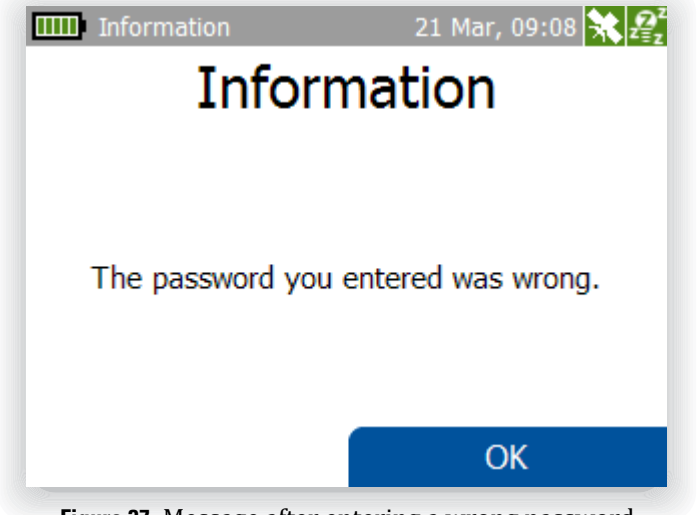

Figure 37. Message after entering a wrong password.

2.2.8 Taking Screenshots

You can save the contents of the FLIR identiFINDER R300's display at any time.

➔ **To take a screenshot**...

1. Press and hold ⏻.
2. Press L.

   You have to press L, even if you swapped the assignment of the operating keys (6.9, p. 122).

   Do not wait too long between pressing ⏻ and L, otherwise you might initiate the power down command (2.6, p. 64).

Screenshots are saved in the FLIR identiFINDER R300's permanent memory as image files named after the screen taken suffixed by the current date, time and time zone offset.

To access the saved screenshots, connect your FLIR identiFINDER R300 to a computer (8.14, p. 207).

You can check the number of saved screenshots in the status display (6.14, p. 130, Figure 38, p. 49) or erase them (6.18, p. 134).

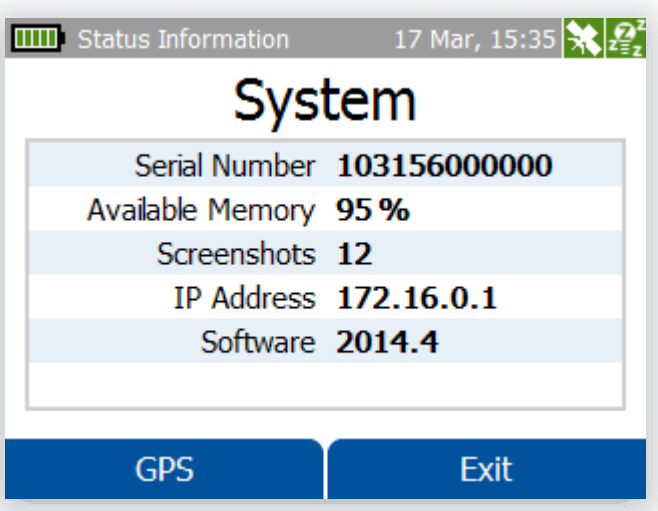

Figure 38. Status display showing the number of saved screenshots.

2.3 The FLIR identiFINDER R300 Holster

For general monitoring of the environment for gamma or neutron radiation, you can insert the FLIR identiFINDER R300 into its holster (Figure 39, p. 50) and wear it on your belt (Figure 40, p. 50). You can still hear and feel the alarms and watch the alarm LEDs.

Figure 39. Inserting the FLIR identiFINDER R300 into a holster so alarm LEDs remain visible

Figure 40. FLIR identiFINDER R300 in a belt holster with visible alarm LEDs

2.4 The FLIR identiFINDER R300 Web Server

To access the FLIR identiFINDER R300's web interface, simply point your web browser to one of the addresses given after a connection between your computer and the FLIR identiFINDER R300 is established (see 7.4, p. 178).

Provided a network connection can be established, you can use any modern browser running on, for example, a desktop or laptop PC, a netbook, a tablet, or a smart phone. The browser must support

- HTML 5
- CSS 3
- Javascript
- Scalable Vector Graphics (SVG)

The following examples were successfully tested:

- Apple Safari 5 (Microsoft Windows, Mac OS X)
- Microsoft Internet Explorer 9 (Microsoft Windows)
- Mozilla Firefox 20 (Linux, Microsoft Windows, Mac OS X)
- Opera 10.6 (Microsoft Windows)

The FLIR identiFINDER R300 web access needs no cookies. If cookies are allowed, they are used to remember your settings, for example the number of items you prefer in listings.

2.4.1 Operating the Web Server Pages

The web pages of the FLIR identiFINDER R300 are available in slightly different layouts for different screen or window widths. A narrow version (Figure 41, p. 52) is used on mobile devices like smart phones or tablet computers. The wider version (Figure 42, p. 53) is used on desktop or laptop computers.

The instrument serving these web pages is identified in the page header, which also contains the menus and several status indicators.

If you print a web page, the page header is suppressed.

The title of the current web page is shown in the main area below the page header. The content of most web pages is divided into sections of related items.

A tool tip giving details about elements of web pages is shown if you hover and stay with the pointer above an element. (Not available on touch-driven devices without pointer.)

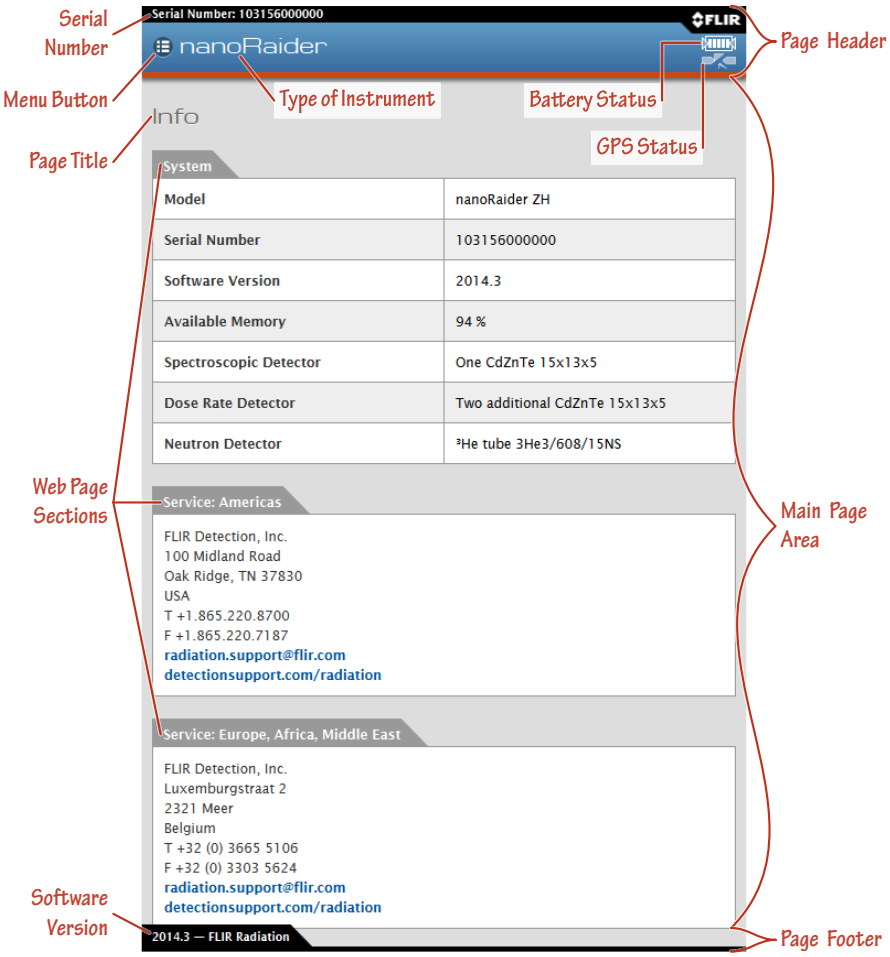

Figure 41. Anatomy of a FLIR identiFINDER R300 web page, narrow layout

The bottom of the pages is marked by the page footer. Especially on systems without visible scroll-bars (most mobile phones and tablet computers), this footer indicates that you have seen all of the page.

Apart from the width, the main difference between the narrow and wide layouts of web pages is the menu in the page header. The wide layout uses the space to show the top level of the menu in a bar (Figure 42, p. 53), the narrow layout (Figure 41, p. 52) shows a button. If you click a menu in either layout the menu hierarchy below that item is revealed and you can navigate to the desired web page (Figure 43, p. 53, Figure 44, p. 54).

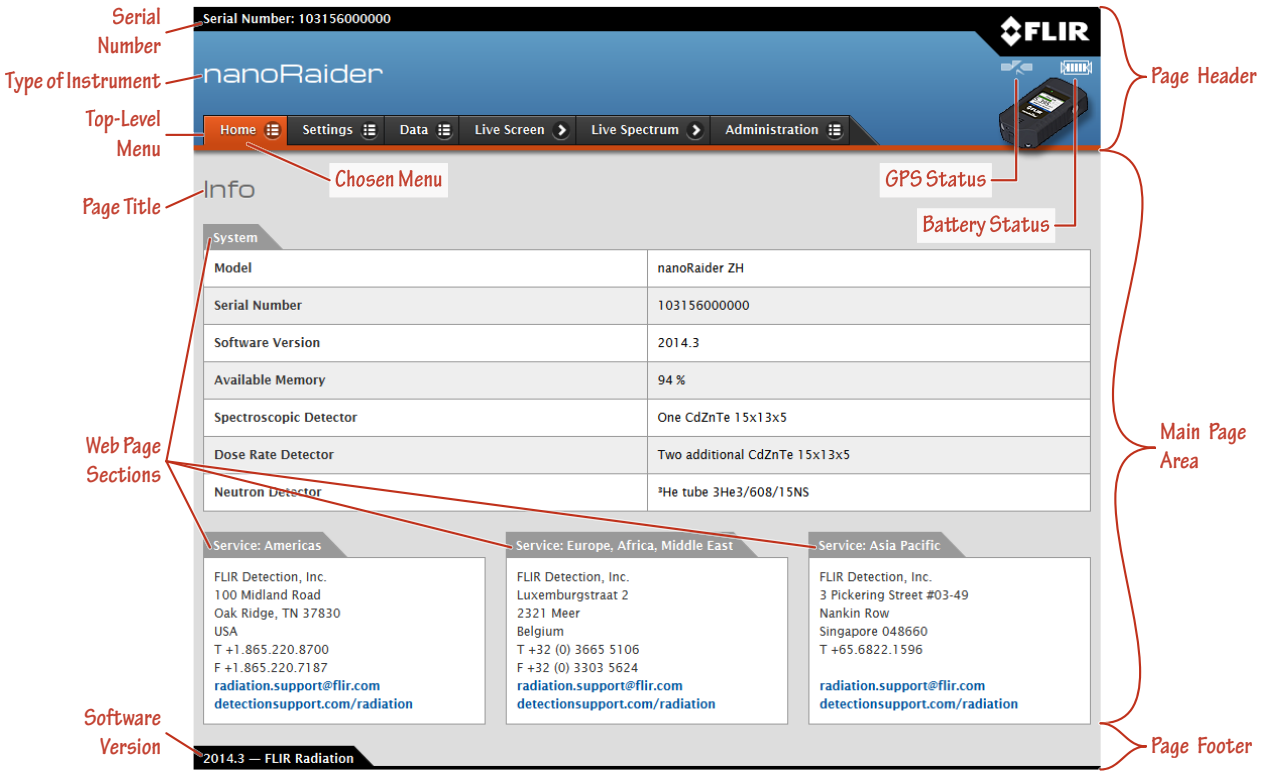

Figure 42. Anatomy of a FLIR identiFINDER R300 web page, wide layout

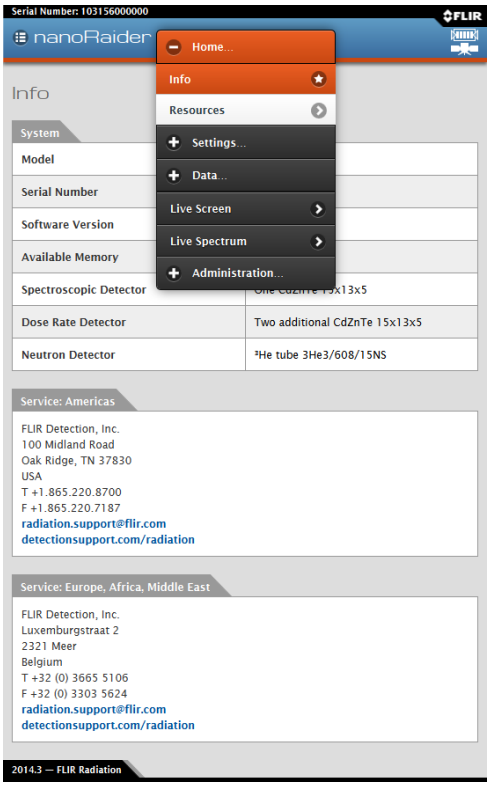

Figure 43. Visible menu hierarchy on a web page with narrow layout

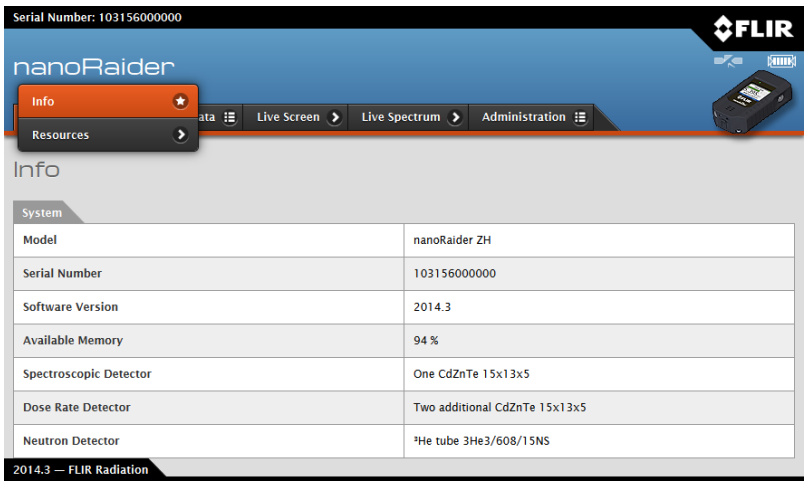

Figure 44. Single submenu on a web page with wide layout

2.4.2 Tables on Web Pages

Some web pages (e.g., Figure 45, p. 55) show tables of stored records available for download from the FLIR identiFINDER R300 to your computer.

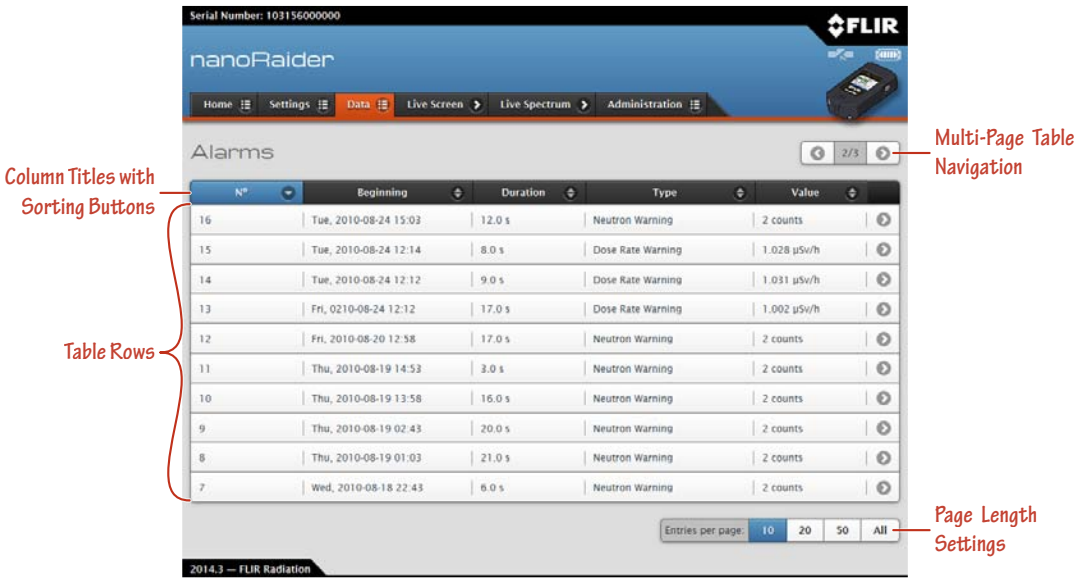
Serial Number: 103156000000
FLIR
nanoRaider
Home
Settings
Data
Live Screen
Live Spectrum
Administration
Alarms
2/3
Multi-Page Table Navigation
Column Titles with Sorting Buttons
N°
Beginning
Duration
Type
Value
16 Tue, 2010-08-24 15:03 12.0 s Neutron Warning 2 counts
15 Tue, 2010-08-24 12:14 8.0 s Dose Rate Warning 1.028 µSv/h
14 Tue, 2010-08-24 12:12 9.0 s Dose Rate Warning 1.031 µSv/h
13 Fri, 0210-08-24 12:12 17.0 s Dose Rate Warning 1.002 µSv/h
12 Fri, 2010-08-20 12:58 17.0 s Neutron Warning 2 counts
11 Thu, 2010-08-19 14:53 3.0 s Neutron Warning 2 counts
10 Thu, 2010-08-19 13:58 16.0 s Neutron Warning 2 counts
9 Thu, 2010-08-19 02:43 20.0 s Neutron Warning 2 counts
8 Thu, 2010-08-19 01:03 21.0 s Neutron Warning 2 counts
7 Wed, 2010-08-18 22:43 6.0 s Neutron Warning 2 counts
Table Rows
Entries per page: 10 20 50 All
Page Length Settings
2014.3 — FLIR Radiation

Figure 45. Anatomy of a web page with a data table

You can set the maximum number of table rows shown per web page.

The current page length is remembered on your computer if cookies are allowed.

Depending on your page length setting and the total number of table entries, a table might be split across multiple pages which you can navigate using the buttons above the table.

Previous

Proceed to the previous page of records.

x/y Number of the current page and number of total pages

Next

Proceed to the next page of records.

You can have the table sorted by columns. The current sorting status is indicated by an icon in the column title. Click one of the icons to change table sorting.

Table is not sorted by this column.

Table is sorted ascending by this column.

Table is sorted descending by this column.

The current sorting is remembered on your computer if cookies are allowed.

You can view details about a record listed in the table.

Show

Opens a window or browser tab showing details of the record for further inspection or analysis (see 2.4.3, p. 56).

2.4.3 Records on Web Pages

These pages show the results of a single measurement stored in the FLIR identiFINDER R300's database, for example, an identification measurement (Figure 46, p. 57). The main contents vary with the type of shown records. Several buttons are available for navigation and housekeeping.

Previous

Proceed to the previous record of the same type.

Back

Return to the table of records of the same type.

Next

Proceed to the next record of the same type.

Spectrum

If the record contains a spectrum, you can hover above the chart to get details of the pointed part shown. (Not available on touch-driven devices without pointer.)

GPS Coordinates

If GPS coordinates were stored with a record, they are shown in an additional section of the details page (Figure 47, p. 58).

Look Up with GeoHack

Send the GPS coordinates stored with the record to the GeoHack page on the Wikimedia Toolserver, a free service of Wikimedia Deutschland e.V. (Internet access required).

The service links to international servers of maps, satellite images, aerial photographs etc. which cover the coordinates saved with your record.

Download

Download the shown record to the computer.

The name of the downloaded `*.zip` archive begins with the serial number of the FLIR identiFINDER R300 followed by the type and the reference number of the record, for example `103156000000 Identification 4711.zip`

Send

Send the record to the configured (see 6.24, p. 149 and 8.6.2, p. 192) reachback server (see 9, p. 219).

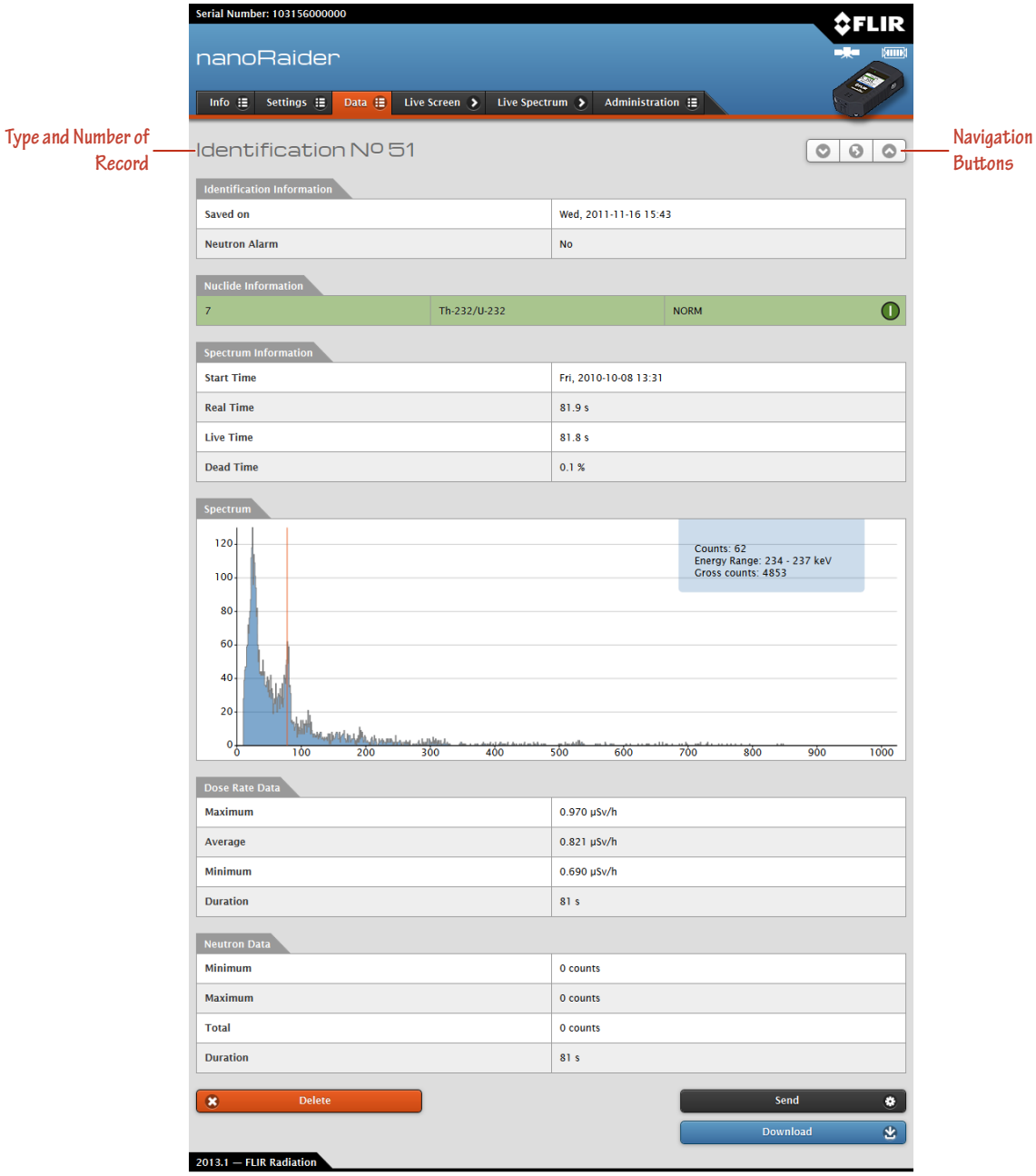

Figure 46. Anatomy of a web page with details of a record

Your computer must be connected to the Internet for this operation.

The transmission starts immediately and you will be kept posted about the progress (Figure 48, p. 58).

You will be informed after the transmission finished (Figure 49, p. 59) or about transmission errors, if any.

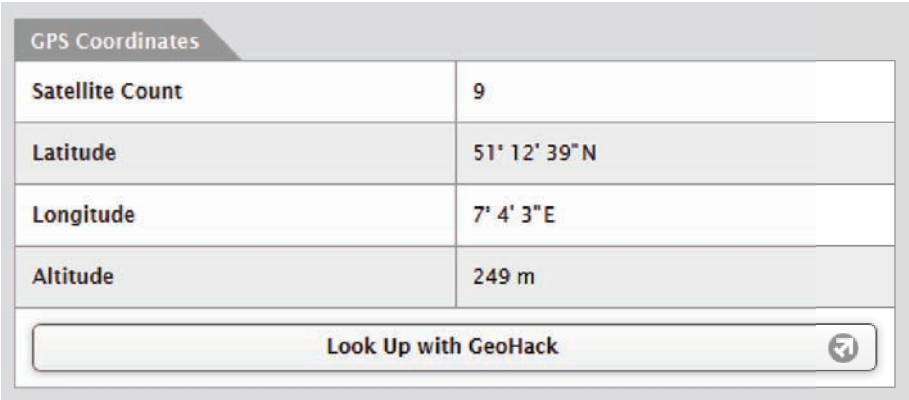

Figure 47. Web page section with GPS coordinates

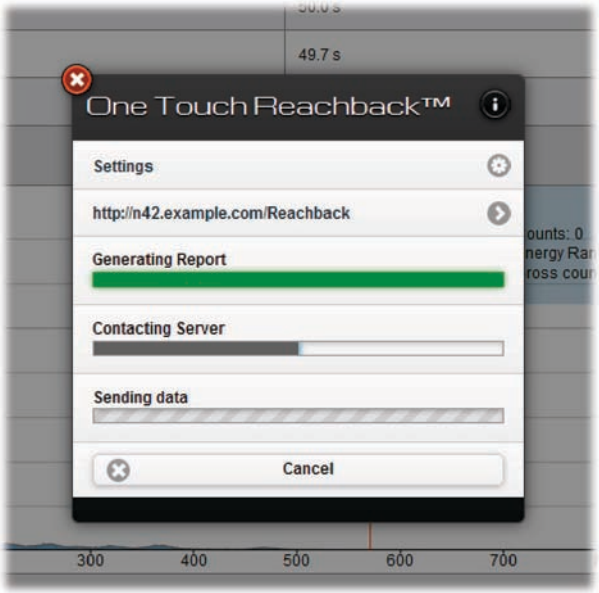

Figure 48. Steps of the transmission of data to a reachback server

Delete

Delete the shown record from the FLIR identiFINDER R300's database.

Records referred to by another record, for example a spectrum referred to by an identification measurement, are not actually deleted but marked as unreachable for future direct accesses.

Figure 49. Successful transmission of data to a reachback server

2.4.4 Printing Web Pages

You can print web pages with the usual printing procedures of your web browser.

Some of the shown elements are suppressed when printing web pages, for example the navigation menus or push buttons (Figure 50, p. 60).

Many web browsers suppress printing of background images and colors. For better printing results we recommend to tick the appropriate boxes. Look for settings like

☑ Print Background Colors

☑ Print Background Images

☑ Print Background Images and Colors

2.4.5 Password Entry

An optional (6.13, p. 129) password may protect against unauthorized or accidental access to advanced settings and commands of your FLIR identiFINDER R300.

If a password is set (6.12, p. 128), you have to enter it in the instrument (see 2.2.7, p. 46) or in the web interface (Figure 51, p. 61) to gain access.

⚠ When entering the FLIR identiFINDER R300 password via the web interface type “L”, “M”, or “R” (upper case).

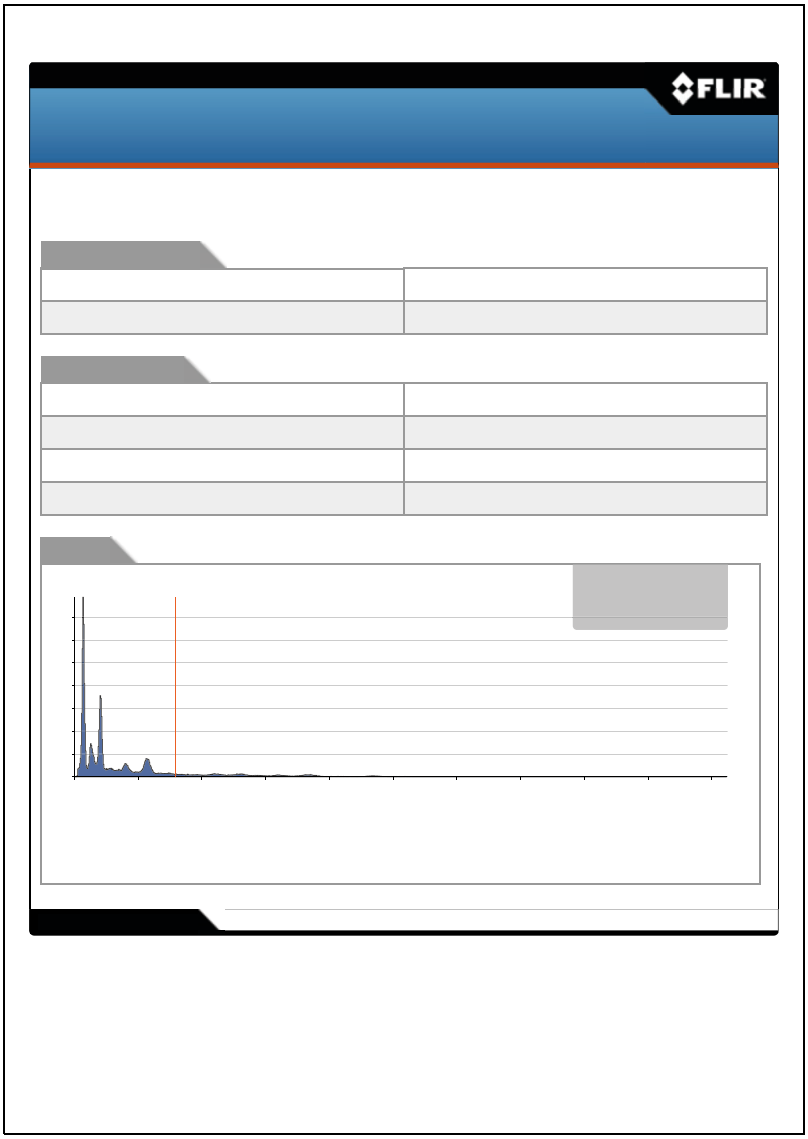

Figure 50. Example printout of measurement results

After entering the correct password, access is granted until you switch off your FLIR identiFINDER R300 (2.6, p. 64).

2.4.6 Administration Access

Special credentials are required to access the administration pages of the web server where you can access system files or upload new software.

The credentials set at the factory are

Username	`admin`
Password	`admin`

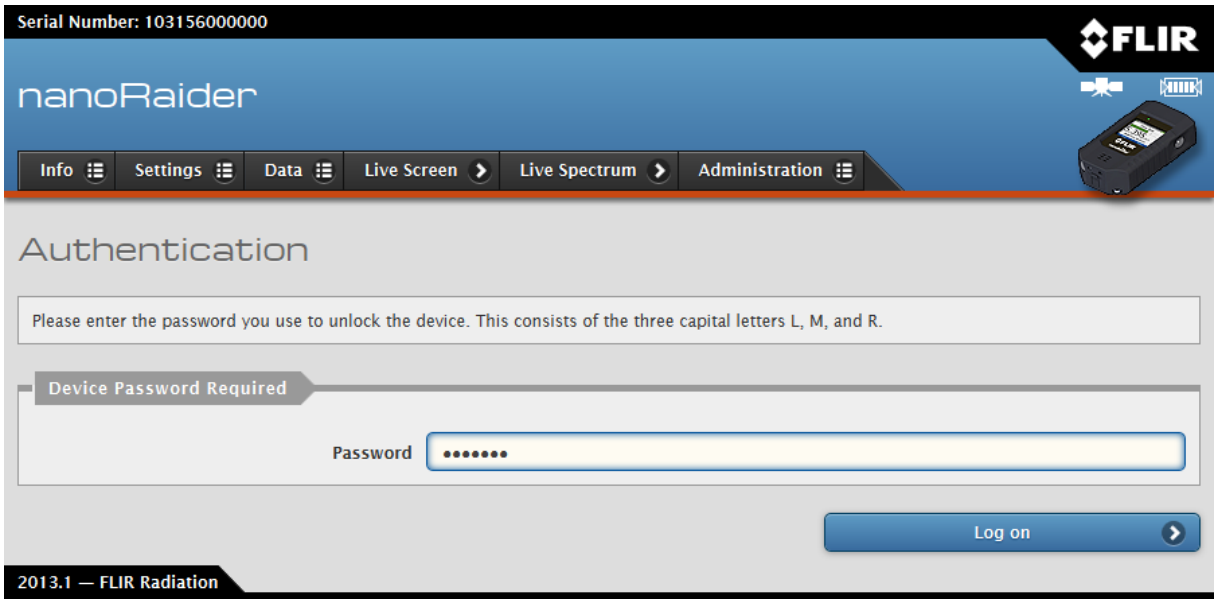

Figure 51. Entering the password before accessing protected web pages

We recommend to change the password for better protection of your instrument against unauthorized access (see 8.18, p. 215).

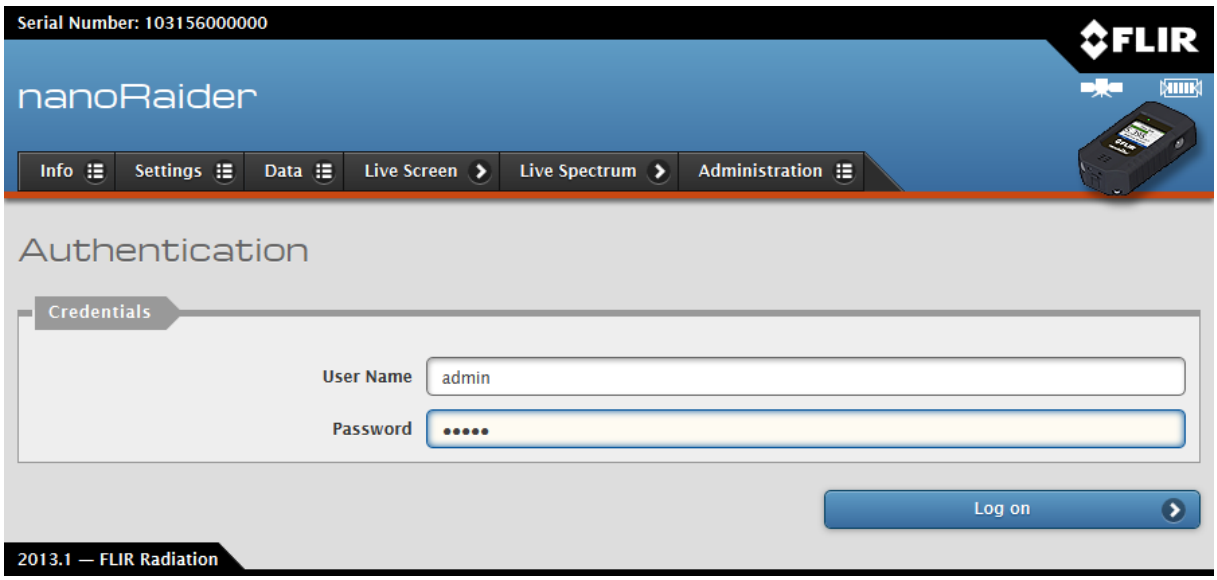

Figure 52. Entering the administration password

2.5 Starting Up the FLIR identiFINDER R300

➔ **To start up the FLIR identiFINDER R300**...

1. Ensure that the instrument is clean and free of visible damages.
2. Ensure that the battery is charged or connect the instrument to an external power source (see 11.2, p. 230)
3. Press and hold ⏻ for a moment.
   The red LED flashes.
   ♦ If your variant is equipped with a neutron detector, the blue LED flashes as well.
4. Release the key.
   Wait a moment while the FLIR identiFINDER R300
   - Identifies itself (Figure 53, p. 62),

Figure 53. Powering up the FLIR identiFINDER R300: Product identification

   - goes through start-up procedures (Figure 54, p. 63),
   - initializes the software (Figure 55, p. 63).

   ⚠ If the time of the FLIR identiFINDER R300's internal clock is unreasonable, most probably caused by the battery being empty for some weeks, you will be asked to set the clock (see 6.10, p. 125).
5. The FLIR identiFINDER R300 switches to the dose rate display (Figure 56, p. 63) and is ready for operation.

Figure 54. Powering up the FLIR identiFINDER R300: Starting up

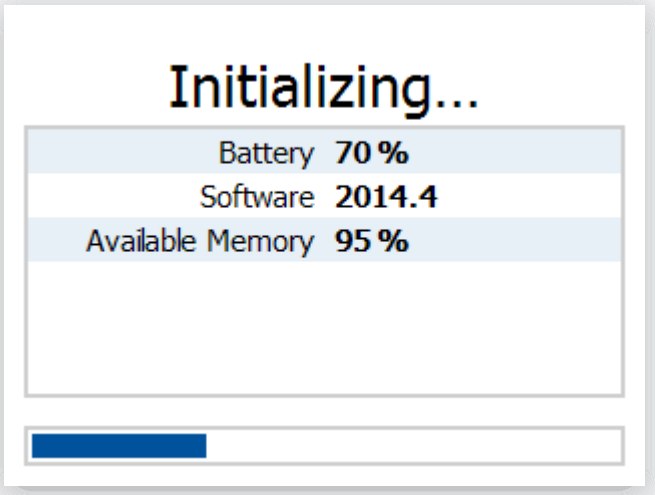

Figure 55. Powering up the FLIR identiFINDER R300: Initialization

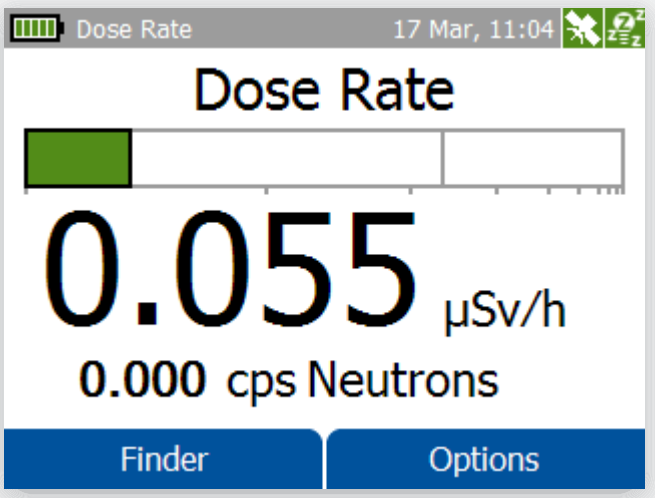

Figure 56. FLIR identiFINDER R300 after powering up.

2.6 Shutting Down the FLIR identiFINDER R300

Several methods are available to shut down the FLIR identiFINDER R300.

➔ **To shut down the FLIR identiFINDER R300 normally**…

1. Press and hold (I).
   After a couple of seconds, the shut down screen will be displayed (Figure 57, p. 64).

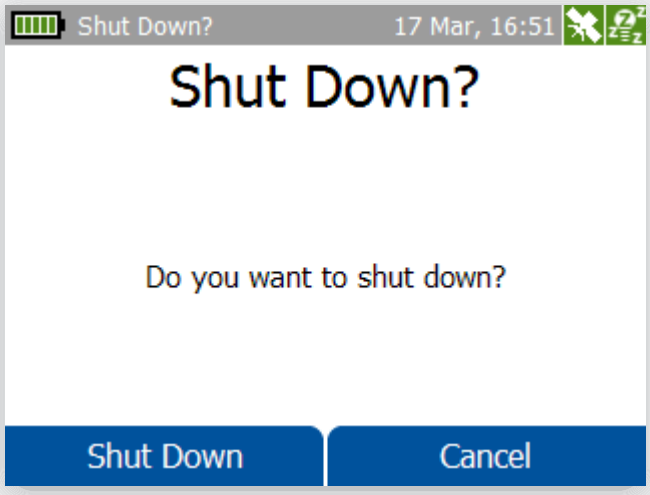

Figure 57. Shutting down the FLIR identiFINDER R300

2. Press (L) to confirm the shut down command.

or Keep (I) depressed and the FLIR identiFINDER R300 will shut down.

or Press (R) to cancel the shut down and resume normal operation.

⚠ If you shut down the FLIR identiFINDER R300 while an alarm is raised (Figure 58, p. 65), the end time of the alarm entry is not stored in the database (5, p. 97). Instead, the end time will reflect that the instrument was shut down before the end of the alarm.

➔ **To shut down the FLIR identiFINDER R300 in case of software failure**…

1. Press and hold (I) for about 20 seconds until the red LED and the beeper emit six short and one long signal.
   The FLIR identiFINDER R300 should shut down.

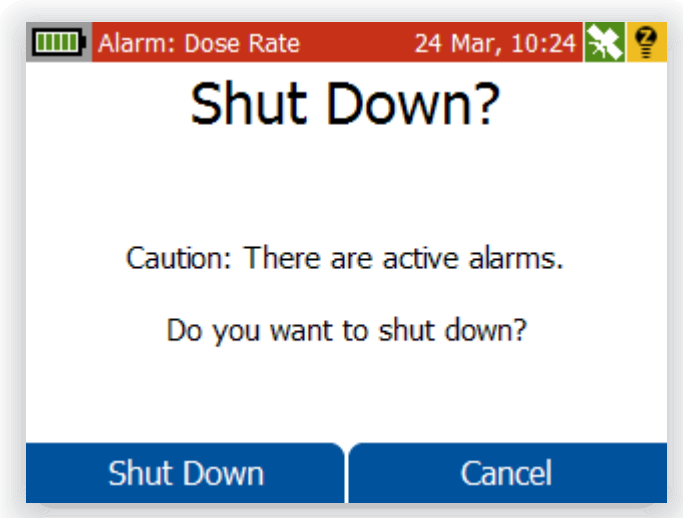

Figure 58. Shutting down the FLIR identiFINDER R300 during an alarm

2.7 Low Power Conditions

When the battery runs out of power, an appropriate warning will be displayed (Figure 59, p. 65) accompanied by a characteristic sound (Figure 60, p. 65). The green status LED flashes with a higher frequency (Figure 9, p. 31).

Figure 59. Battery almost empty.

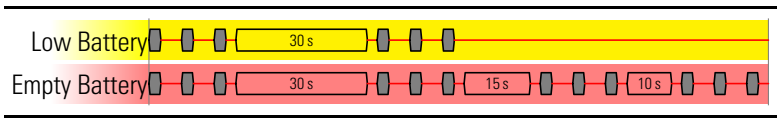

Figure 60. Schematic timing of triple beeps indicating low power conditions.

You can Shut Down with R or Continue using the FLIR identiFINDER R300 with L until the battery is completely empty, however, the only remaining operation is the dose rate mode (Figure 61, p. 66 and 4.1, p. 86).

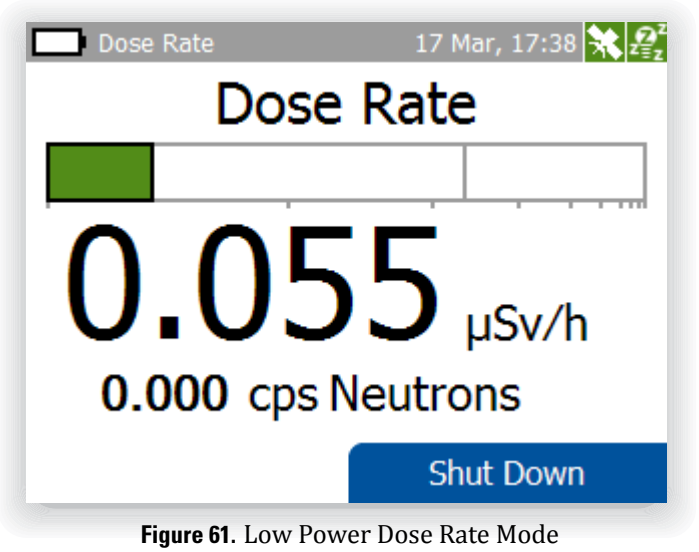

Figure 61. Low Power Dose Rate Mode

If the battery is completely empty, another message (Figure 62, p. 66) will appear accompanied by a characteristic sound (Figure 60, p. 65).

Figure 62. Battery is empty.

You should switch off the instrument.

Please connect the FLIR identiFINDER R300 to an external power source (see 11.1, p. 229).

2.8 Resetting the FLIR identiFINDER R300

The FLIR identiFINDER R300 can be reset by performing a normal shut down–start up cycle.

All your custom settings remain unchanged by this procedure. To revert the instrument to the factory defaults, use Reset Factory Settings (6.15, p. 132).

➔ **To reset the FLIR identiFINDER R300**…

1. Shut down the instrument (2.6, p. 64)

   Should a reset be necessary because the instrument does not react to your input anymore, you might have to use the forced shut down procedure described in section 2.6, p. 64.

2. Start up the instrument (2.5, p. 62).

Chapter 3

Field Operating Guide

This chapter provides a guide to the basic operating procedures necessary to survey an object and generate the analyzed results for the survey of that object.

In many cases, your organization or institution will have its own Standard Operating Procedure (SOP). In such a case, you should refer to that SOP.

A typical application of the FLIR identiFINDER R300 is the survey of objects for radioactive radiation and to document the results of the survey. This process involves these fundamental steps:

1. Turn on and check the instrument (see 3.1, p. 70).
2. Observe the dose rate in your environment to detect gamma radiation (see 3.2, p. 70).
3. Locate the source of the radiation (see 3.3, p. 73).
4. Identify the nuclides that gamma radiation is originating from (see 3.4, p. 75).
5. Transfer the results to a local computer for further processing (see 3.5, p. 77).
6. Send the results to a remote service (see 3.6, p. 81).
7. Turn off the instrument (see 3.7, p. 84).

Please familiarize yourself with the names and positions of the FLIR identiFINDER R300's parts and the general methods of operation (chapter 2, p. 27) before proceeding with this chapter.

Chapter 6, p. 103 provides information about **all** operations and describes the operations mentioned here in more detail. More precise pointers into the reference will be provided with the operation steps outlined below.

The instructions outlined in this chapter assume a variant with a neutron detector (A.1, p. 237) and with factory settings.

3.1 Switching On and Checking the Instrument

This description assumes normal operation of the instrument. For a detailed description of the startup procedure refer to section 2.5, p. 62.

➔ **To start up the FLIR identiFINDER R300**...

1. Press and hold ⏻ for a moment until the screen backlight appears.
2. Release the key.

   Wait a moment while the FLIR identiFINDER R300

   - identifies itself,
   - goes through start-up procedures,
   - initializes the software (Figure 63, p. 70).

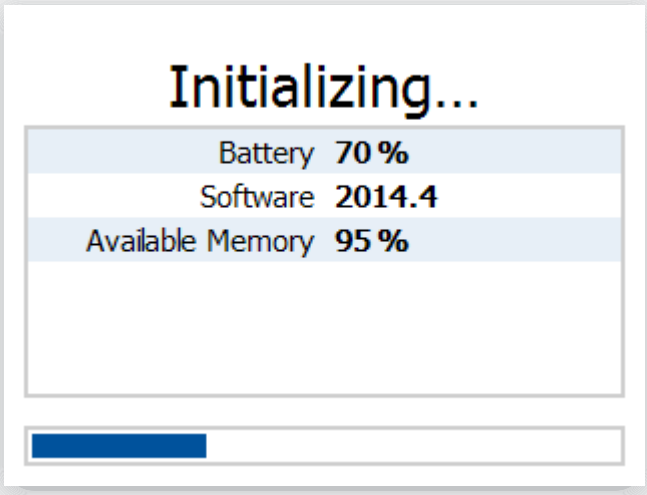

Figure 63. Powering up the FLIR identiFINDER R300: General system status

3. Verify if there is enough energy in the battery and available space in the memory (Figure 63, p. 70).
4. The FLIR identiFINDER R300 switches to the dose rate display (Figure 64, p. 71) and is ready for operation.

3.2 Observing the Environment

The Dose Rate Mode (Figure 64, p. 71) is the basic operation mode of the FLIR identiFINDER R300, please refer to 4.1, p. 86 for a detailed description.

3.2.1 Gamma Radiation Survey

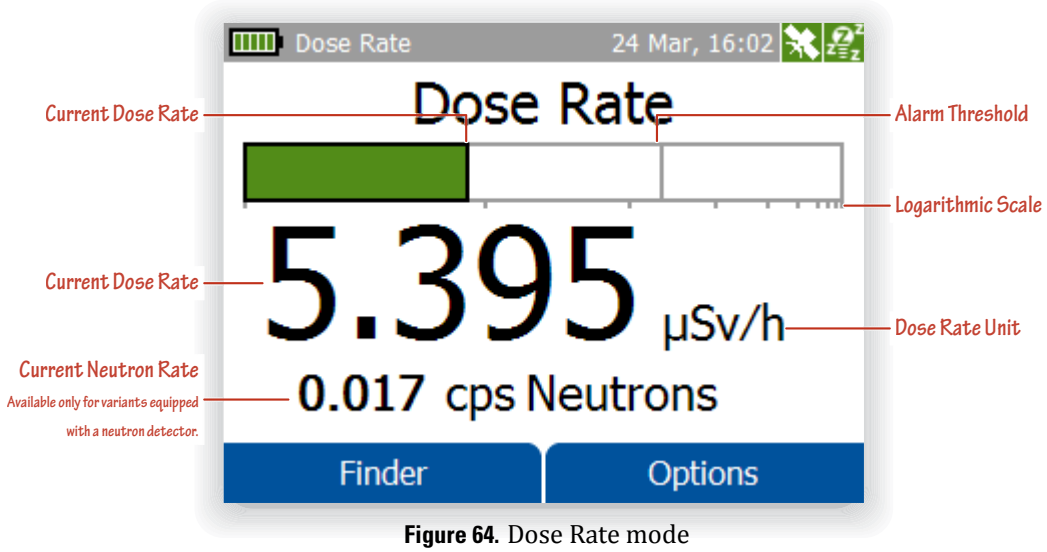

Figure 64. Dose Rate mode

➔ **To survey for gamma radiation**…

1. Move the instrument around (e.g. Figure 65, p. 72) and observe the display (Figure 64, p. 71). The current dose rate is shown in large digits and as a bar chart.

   For best dose rate calculations the source must not be too close to the instrument (Figure 239, p. 242).

   You can change the dose rate unit (see 6.31, p. 159) and the alarm thresholds (see 6.33, p. 161).

The FLIR identiFINDER R300 continuously compares the radiation to warning and alarm thresholds (see 6.33, p. 161). Should the radiation exceed one of the thresholds, the instrument raises an alarm which is reported on-screen (Figure 66, p. 72) and optionally by LEDs, beeper, and vibrator (see 5, p. 97 for details about the beep and vibration patterns).

You can press L Mute to silence alarm annunciation by beeper and vibrator. Press R Acknowledge after you took notice of the alarm or warning.

The alarm or warning will be reported in the title bar until the radiation drops below the appropriate threshold (Figure 66, p. 72).

3.2.2 Neutron Radiation Survey

♦ Available only for variants equipped with a neutron detector.

➔ **To survey for neutrons**…

1. Hold the FLIR identiFINDER R300 close to your body so that the neutron detector (Figure 238, p. 241) is close to you (Figure 67, p. 73).

Figure 65. Surveying an object with the FLIR identiFINDER R300.

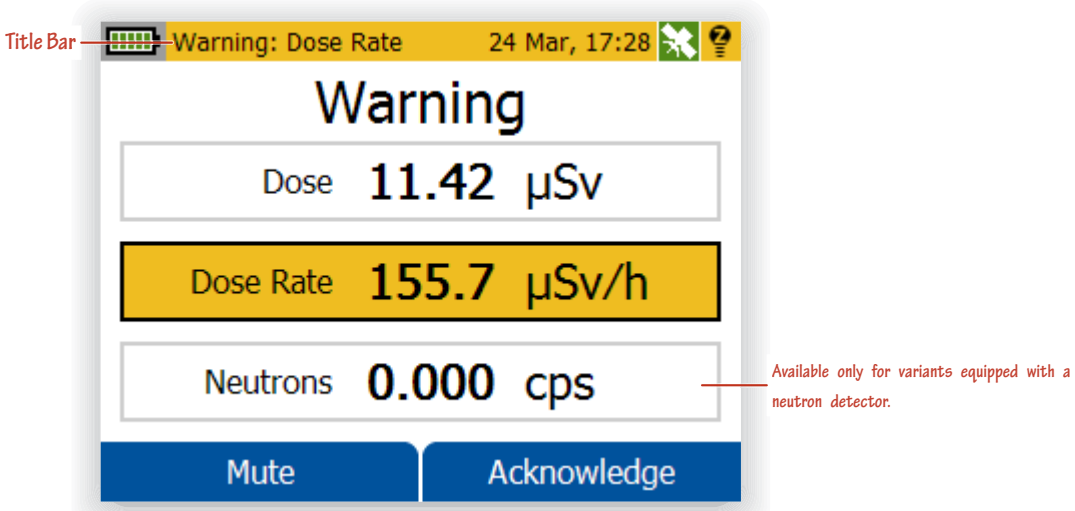

Figure 66. Dose rate warning reported on screen

2. Turn around 360° to detect the neutrons regardless of your location relative to the source.

Figure 67. Optimum posture for neutron detection

⚠ For tests involving un-moderated neutron sources, a 30 cm × 30 cm × 15 cm PMMA phantom (Figure 240, p. 243) or equivalent must be placed between the source and the detector in the FLIR identiFINDER R300 (Figure 238, p. 241) in order to provide adequate moderation of fast neutrons and to simulate the field operation instructions given here.

3.3 Locating a Radiation Source

Once you suspect the presence of a radiation source from observing the environment, you should use the FLIR identiFINDER R300's Finder Mode (4.2, p. 88) to determine the exact location of the source.

➔ **To locate a radiation source**…

1. Move the instrument to a low-radiation position for a background measurement.
2. Press L Finder to switch from Dose Rate Mode to Finder Mode.
3. Wait until the FLIR identiFINDER R300 finishes the background measurement (Figure 68, p. 74).

   If you are in a hurry, you can R Exit the background measurement (not recommended). The instrument will use the most recent background taken after it was switched on.
4. Move the instrument around to find the radiation source.

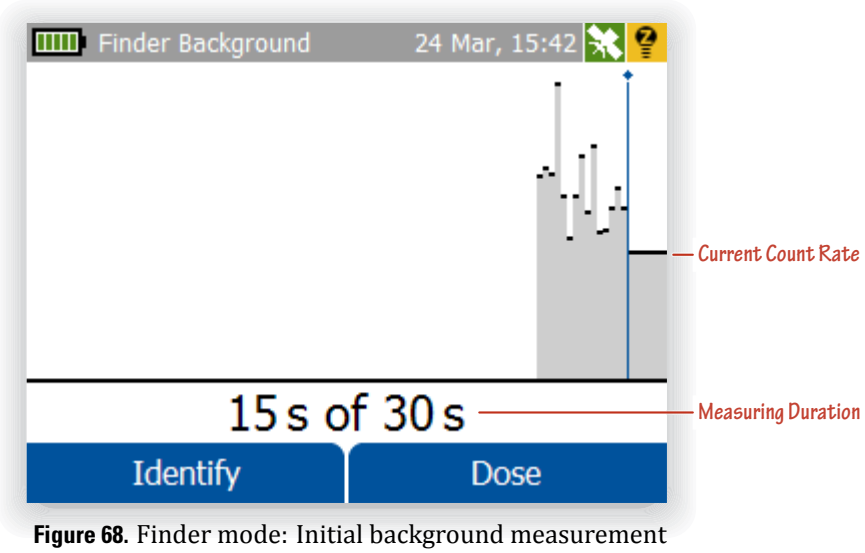

Figure 68. Finder mode: Initial background measurement

The FLIR identiFINDER R300 averages the count rate for adjustable intervals (see 6.30, p. 157) and will guide you with its display (Figure 69, p. 74) but mainly by emitting sounds indicating the distance to the source. The closer you are to the source, the more "excited" the beeper and the vibrator get.

Listening to the beeper, you can move around to look for the source while watching your step instead of the screen.

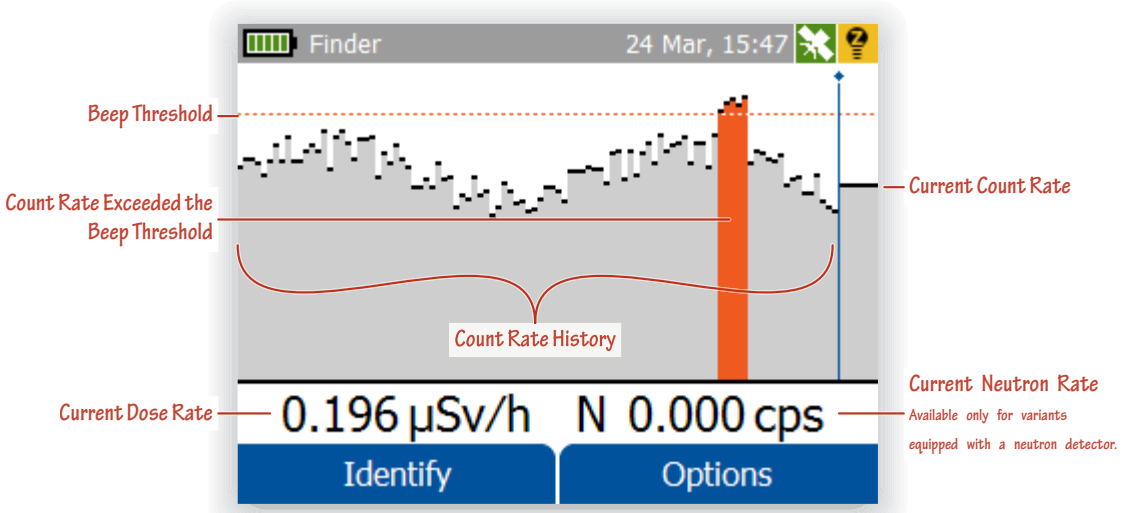

Figure 69. Finder mode: Continuous measurement

You can change the sensitivity of the beeper (see 6.30, p. 157).

3.4 Identifying a Radiation Source

After you have detected a radiation source by surveying the ambient dose rate (3.2, p. 70) or by locating its position (3.3, p. 73), you can use the FLIR identiFINDER R300's Identification Mode (4.3, p. 90) to find out the nuclide the radiation is originating from.

The FLIR identiFINDER R300 can identify and report a number of nuclides by analyzing the radiation spectrum they emit. You can inspect the library of these nuclides in appendix C, p. 259 or, with less detail, in the instrument itself by checking the nuclide visibility under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Identification Options (p. 103) ➤ Nuclide Visibility (p. 118)

Depending on your instrument's settings, you might have to enter a password to access the list (2.2.7, p. 46).

➔ **To identify radionuclides**...

1. If the FLIR identiFINDER R300 runs in Dose Rate Mode (Figure 64, p. 71) and Finder Mode is enabled, then press Finder. If Finder mode is disabled, then Identify will be present so proceed to the next step.
2. Press Identify to switch to Identification Mode (Figure 70, p. 75).

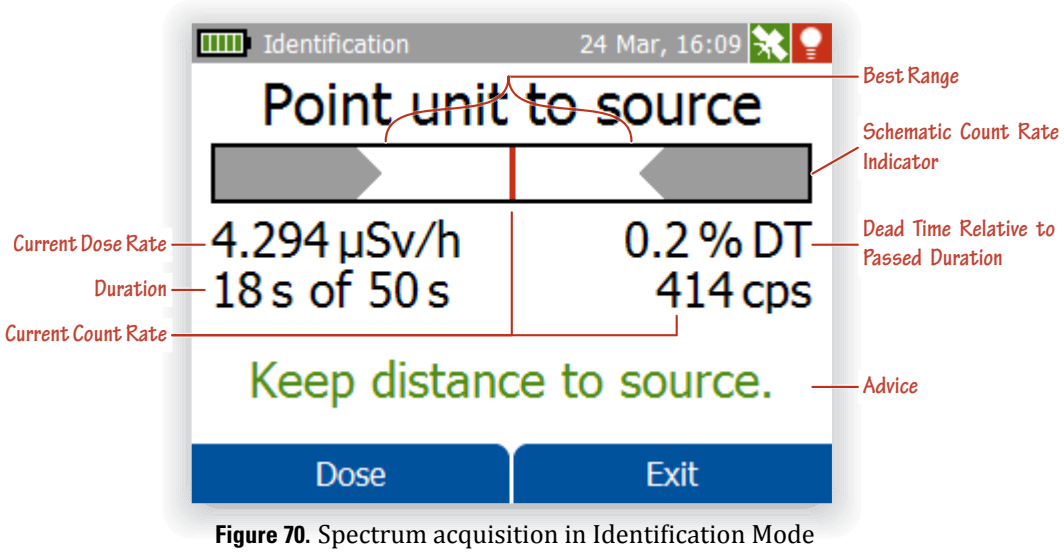

Figure 70. Spectrum acquisition in Identification Mode

The FLIR identiFINDER R300 begins to acquire a spectrum of the radiation. Normally, there is a preset acquisition duration, but you can change that to a minimum number of counts set at the factory (6.4, p. 116).

3. Move the instrument into a good position for optimal data acquisition.

   Try to get the current count rate marker into the center of the schematic indicator (Figure 70, p. 75) by getting closer to or away from the source.

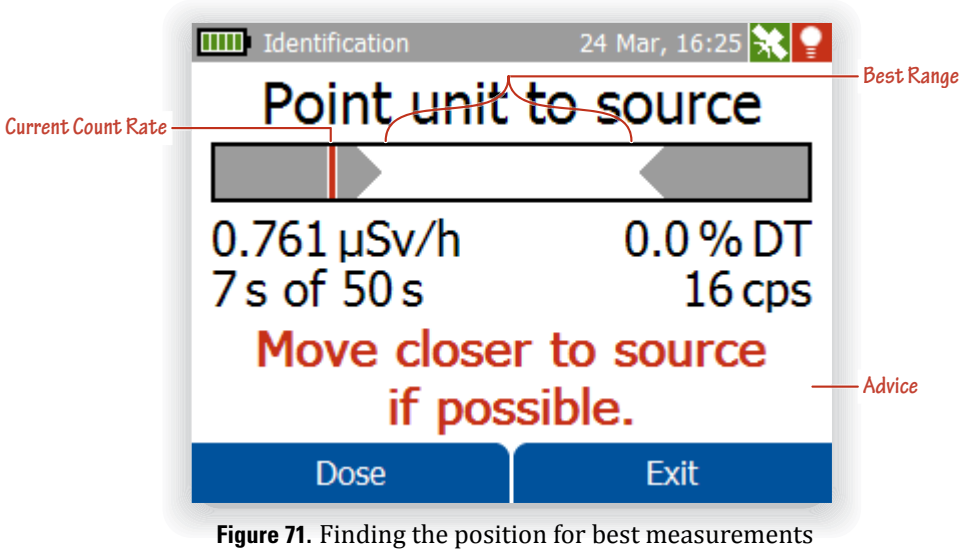

Figure 71. Finding the position for best measurements

The FLIR identiFINDER R300 assists with advice given on-screen (Figure 71, p. 76).

4. Wait until the preset acquisition duration is over.

   The FLIR identiFINDER R300 applies the identification algorithm to the acquired data and shows the result (Figure 72, p. 76). Additionally, the identification results including the spectrum and, if required and available, the GPS coordinates are automatically saved in the FLIR identiFINDER R300's database.

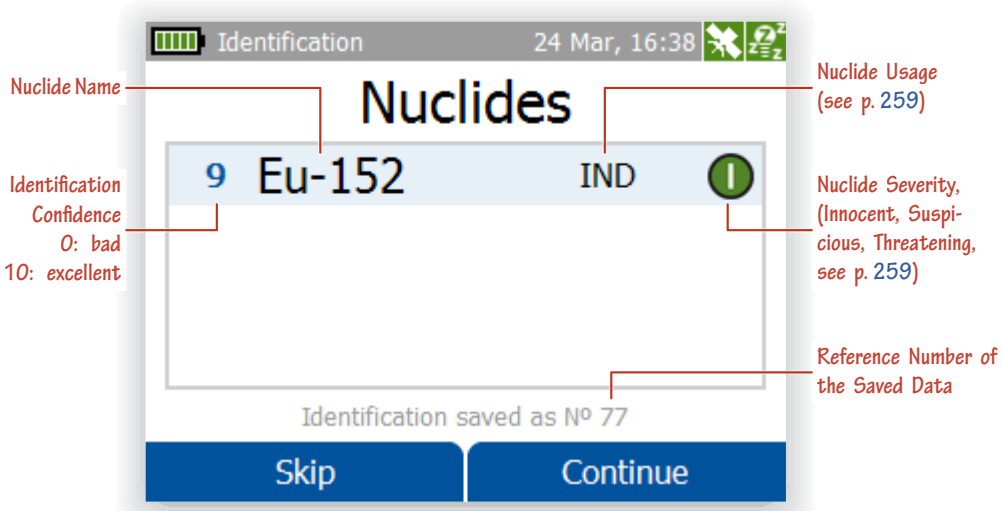

Figure 72. Identification results

Nuclides the identification algorithm did not recognize or those recognized but having their visibility suppressed (see 6.5, p. 118) are reported as "Unknown".

You can specify whether confidence, usage, or severity are shown, see 6.4, p. 116.

5. If necessary, you can acquire more spectrum data to improve the identification by pressing Continue.

The FLIR identiFINDER R300 will acquire more data for the preset extra duration (see 6.4, p. 116).

6. You can inspect the spectrum acquired for the identification by pressing Skip and Spectrum (Figure 73, p. 77). Please refer to 6.2, p. 106 for options and commands for spectrum viewing.

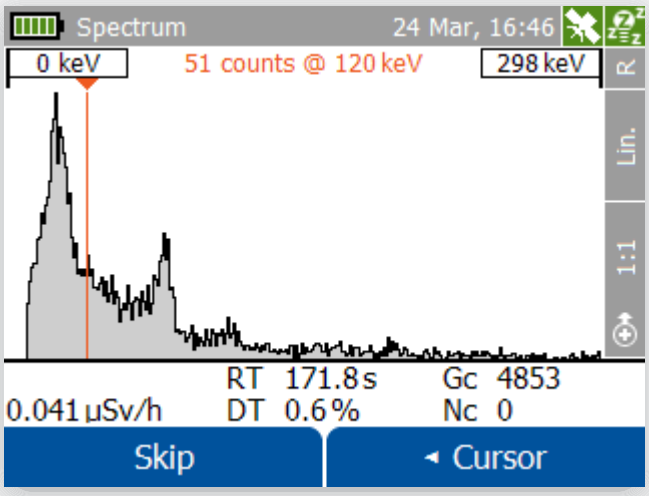

Figure 73. Spectrum the identification is based upon

3.5 Communicate with a Local Computer

You can access the FLIR identiFINDER R300's settings and stored data from a computer locally connected to the instrument.

The FLIR identiFINDER R300 acts as a web server so you need no special software other than your standard web browser. For some computer operating systems, however, you need to install drivers for the connection. Please refer to section 7, p. 167 for details.

➔ **To transfer identification results to a local computer**…

⚠ These instructions assume that your computer is correctly prepared. Consult section 7, p. 167 or your IT administrator for help.

1. Connect the FLIR identiFINDER R300 to your computer with the included USB cable (refer to section 7.1, p. 168 for details).

   After establishing the connection, the FLIR identiFINDER R300 will display its IP address. (Figure 74, p. 78)

2. Use your computer's standard web browser to navigate to the given IP address.

   The FLIR identiFINDER R300's home page opens and displays diverse information regarding your FLIR identiFINDER R300 (Figure 75, p. 78).

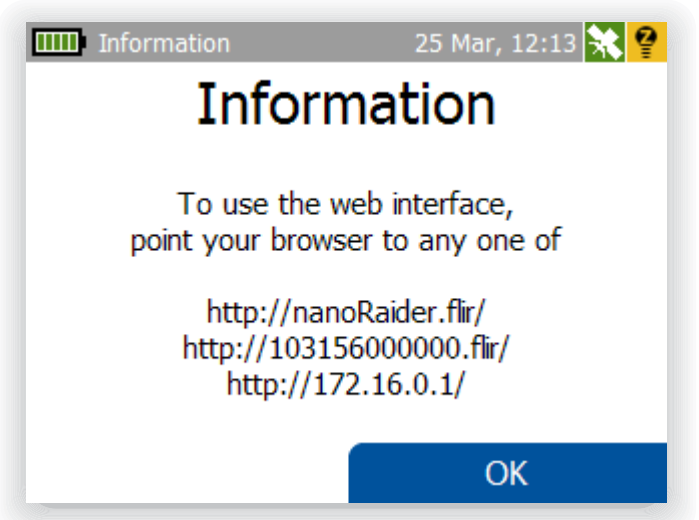

Figure 74. Valid IP address after a connection was established

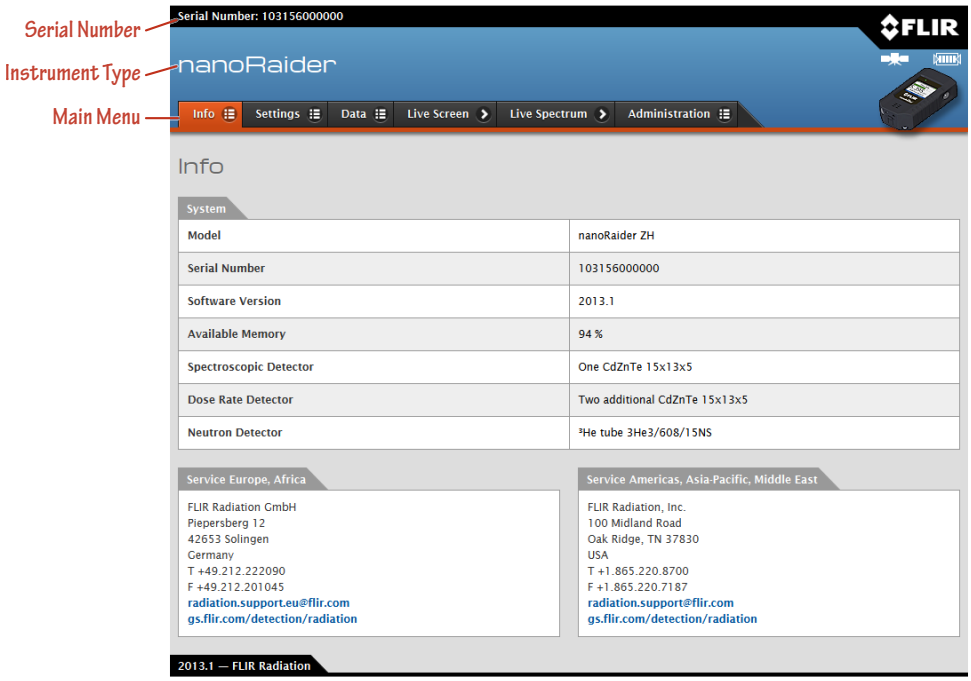

Figure 75. The FLIR identiFINDER R300's home page

3. Open the table with identification records stored in the FLIR identiFINDER R300's database (Figure 76, p. 79) via the menu Data ▶ Identifications.

4. To look for the desired data you can click the sorting button in one of the column titles (Figure 76, p. 79).

5. If many records are stored in the database, you might need to turn pages with the multipage table navigation (Figure 76, p. 79).

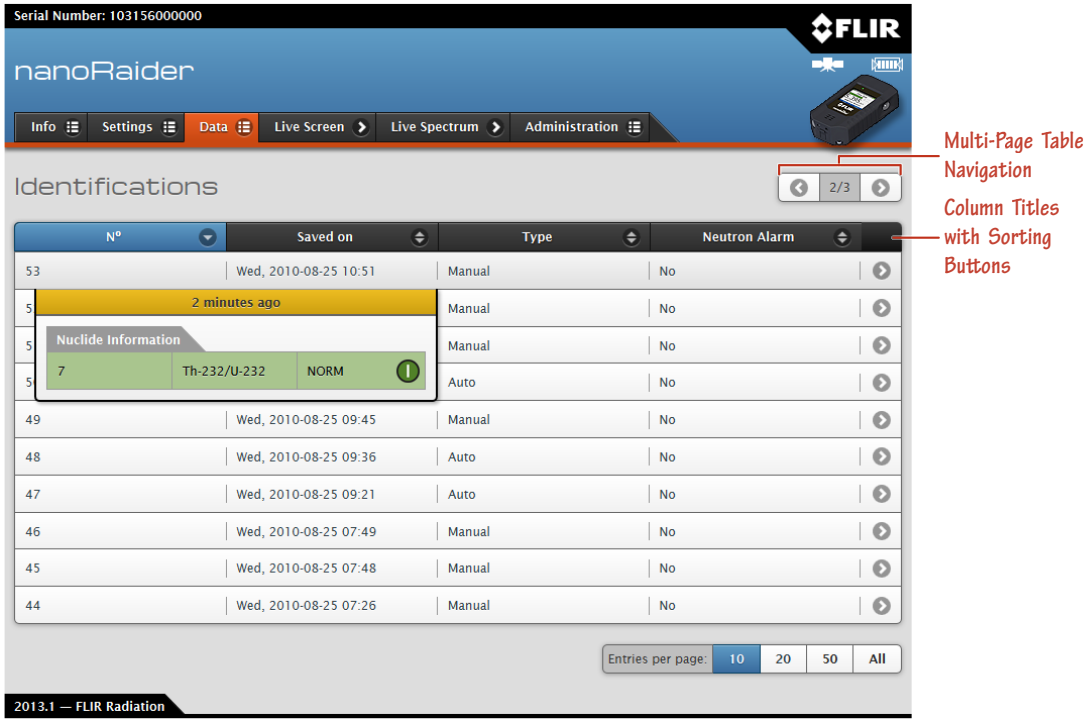

Figure 76. Table of identification result records

6. To view a summary of a record, hover the pointer over the table row of the record (Figure 76, p. 79). (Not available on touch-driven devices without pointer.)
7. To view a detailed report of a record, click Show.

   The details will be shown on separate page (Figure 77, p. 80).
8. To print the report, use your browser's Print command.
9. To download the identification record to your computer in the formats specified in the settings (8.6.4, p. 192), click Download and follow the instructions of your web browser.

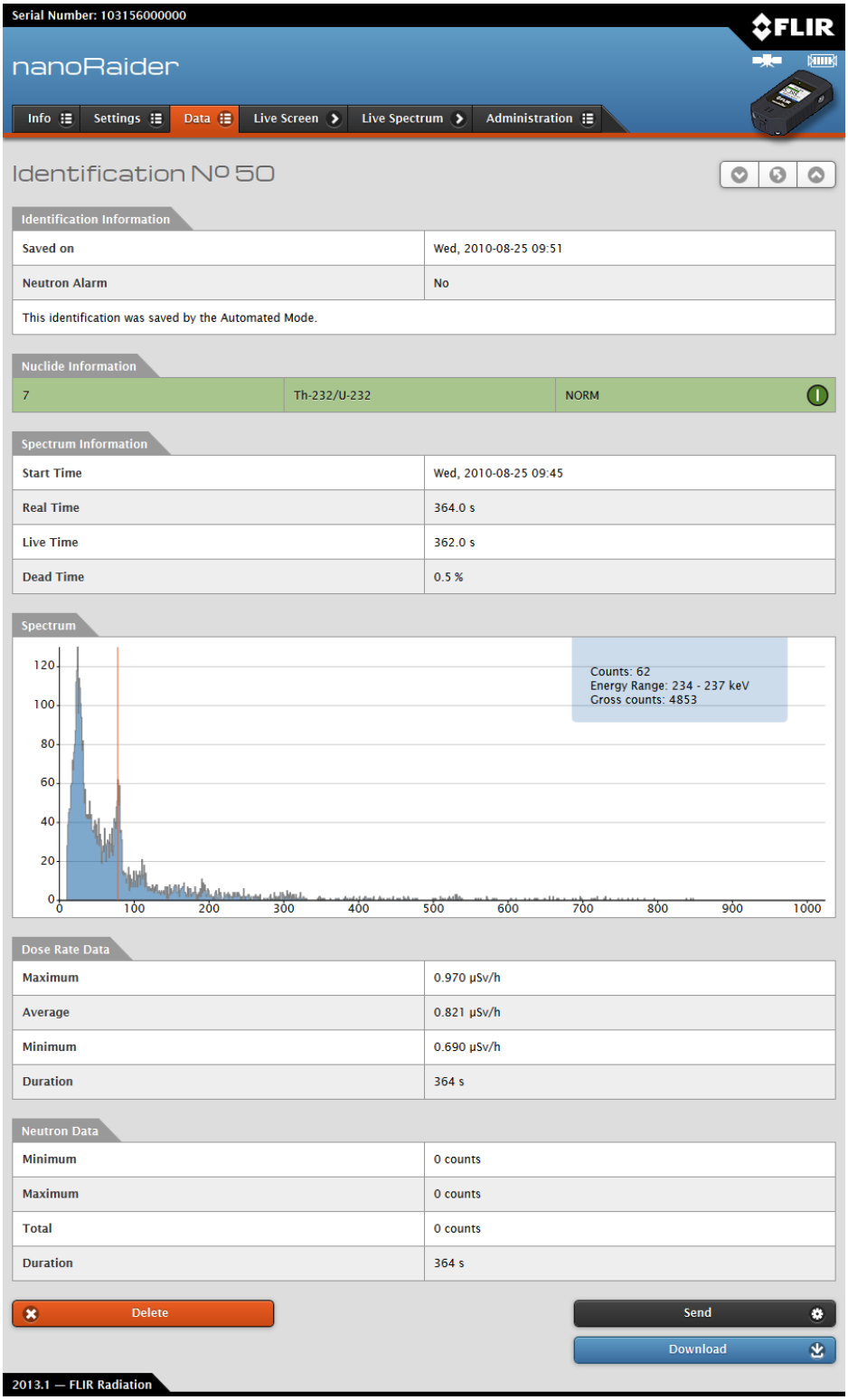

Figure 77. Details of an identification result record

3.6 Sending Results to a Remote Server

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

You can transfer identification results or spectra to a remote server for further processing or analysis. An ANSI N42.42 file (p. 269) containing the data is sent from the FLIR identiFINDER R300 to a cell phone via short range Bluetooth radio and from the phone to the remote server via the Internet.

The connection requires some initial setup on the FLIR identiFINDER R300 and on the mobile phone, please refer to section 9, p. 219 for details.

➔ **To send identification result records to a remote server**...

⚠ These instructions assume that your FLIR identiFINDER R300 and your cell phone are correctly prepared. Consult section 9, p. 219 or your IT administrator for help.

1. While the identification results (for example of section 3.4, p. 75, Figure 72, p. 76) are displayed, press Skip to reveal the command Send (Figure 78, p. 81).

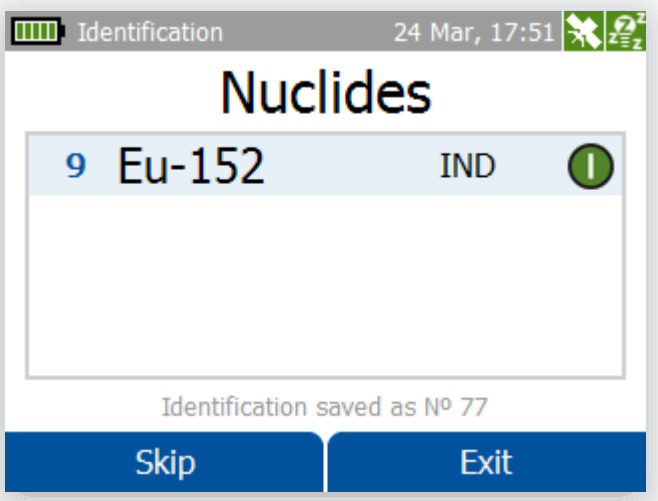

Figure 78. Identification results

2. Initiate the data transfer with Send.

   A summary of the record is shown (Figure 79, p. 82).

3. Start the data transfer with Send.

   During the transfer of data you will be kept posted about the progress of the transmission steps (Figure 80, p. 82).

If this is the first time you are sending data since switching on the FLIR identiFINDER R300, you have to pair it with your Bluetooth phone. Please refer to section 6.23.3, p. 144 for the complete details.

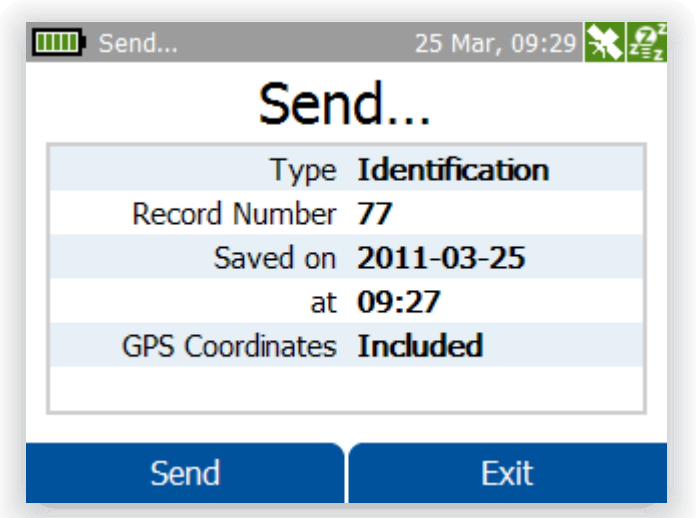

Figure 79. Identification result summary for sending

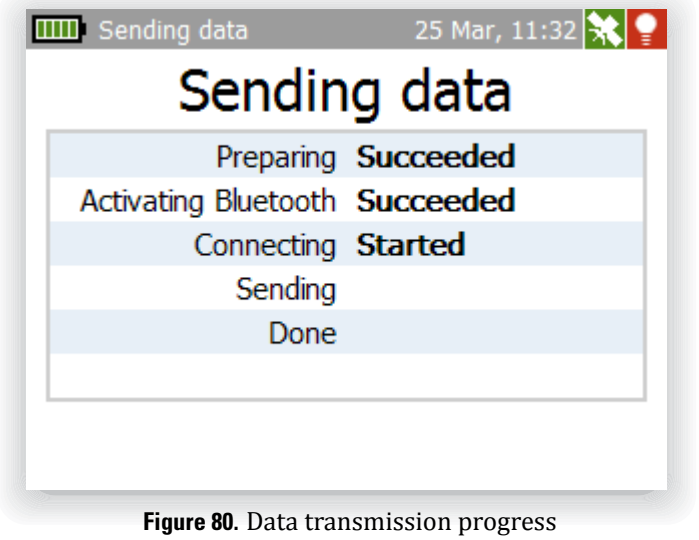

Figure 80. Data transmission progress

➔ **To pair with a Bluetooth device**...

1. Press Start Search (Figure 81, p. 83) to have the FLIR identiFINDER R300 search for suitable Bluetooth devices.
2. Choose the desired Bluetooth device from the list shown (Figure 82, p. 83) with Down.
3. To start the pairing with the chosen device, press Select. Your device might require additional steps like entering a PIN. Use the PIN shown on your FLIR identiFINDER R300 screen (Figure 83, p. 83).
4. Your FLIR identiFINDER R300 displays some details about the paired device and is ready to send data.

Bluetooth Periphery
25 Mar, 10:13
Search
Prepare your Bluetooth devices to be found and press "Start search" to start a search sweep for them
Start search
Exit

Figure 81. Ready to search for Bluetooth devices

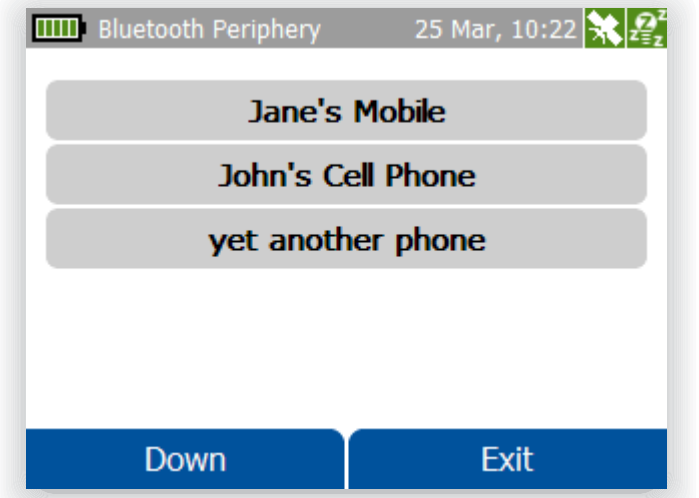

Figure 82. List of suitable Bluetooth devices detected

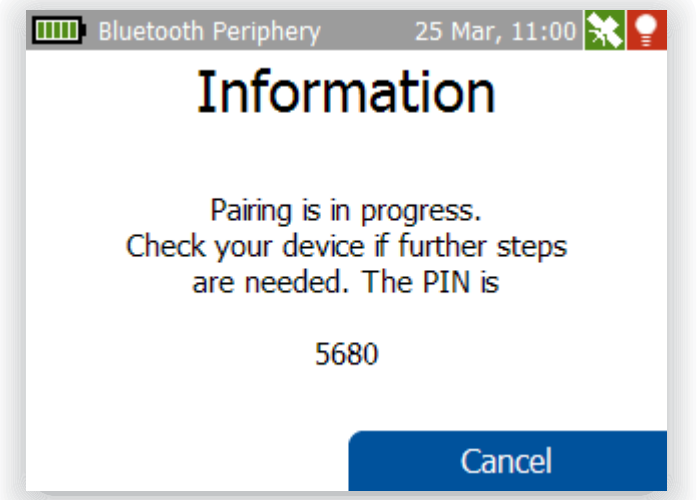

Figure 83. Pairing with a Bluetooth device

3.7 Switching Off

After you are done with all your measurements, you should shut down the FLIR identiFINDER R300. The details on shutting down are given in section 2.6, p. 64, the recommended procedure follows:

➔ **To shut down the FLIR identiFINDER R300**...

1. Press and hold (I).
   After a couple of seconds, the shut down screen will be displayed (Figure 84, p. 84).

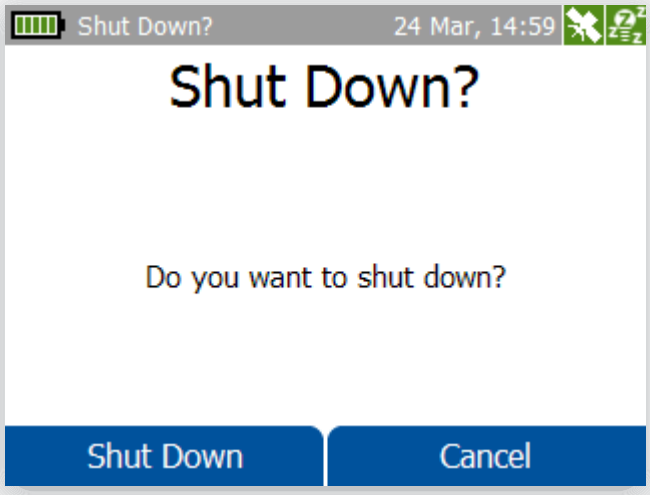

Figure 84. Shutting down the FLIR identiFINDER R300

2. Press (L) to confirm the shut down command.

Store your FLIR identiFINDER R300 in its case while not in use.

Chapter 4

FLIR identiFINDER R300 Modes

This chapter provides detailed descriptions of the FLIR identiFINDER R300's essential measuring modes for day-to-day procedures.

Dose Rate Mode

Observe the ambient radiation (see 4.1, p. 86)

Finder Mode

Locate radiation sources (see 4.2, p. 88)

Identification Mode

Identify radiating nuclides (see 4.3, p. 90)

Automated Mode

Have the unattended instrument identify radiating nuclides at predefined time intervals (see 4.4, p. 93)

Remotely Controlled Spectrum Acquisition

Acquire spectra via the web interface (see 4.5, p. 95, 8.16, p. 209)

The alarms overriding all other modes and commands are detailed in Chapter 5, p. 97.

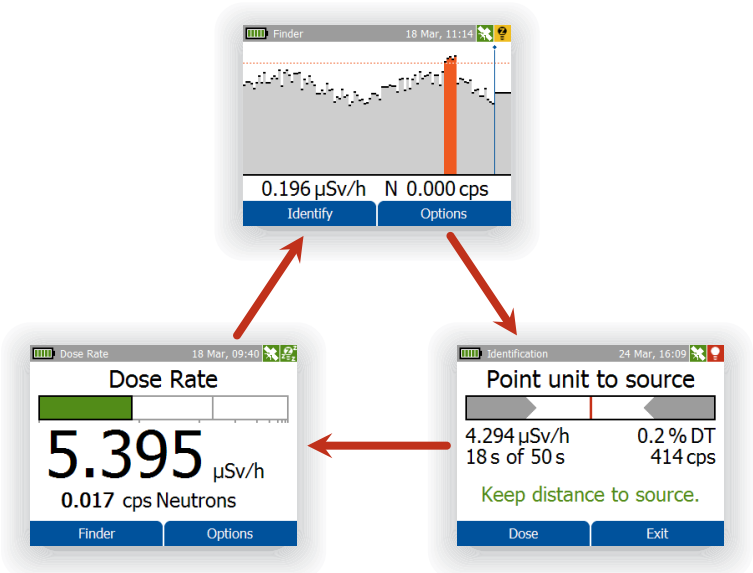

Figure 85. Cycling the manual modes Dose Rate, Finder, and Identification

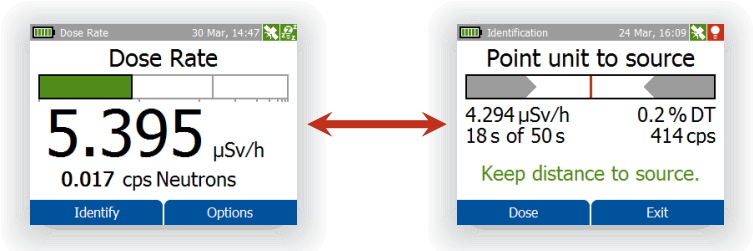

Figure 86. While Finder mode is disabled, cycling modes will toggle between Dose Rate and Identification modes

4.1 Dose Rate Mode

The Dose Rate Mode is the basic operation mode of the FLIR identiFINDER R300. It is activated after starting up the instrument.

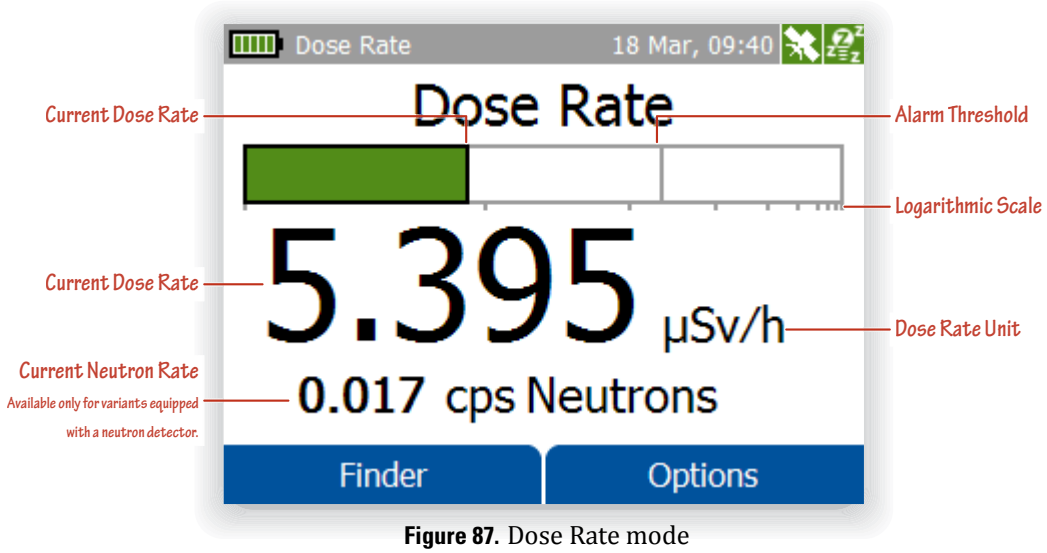

Figure 87. Dose Rate mode

For best dose rate calculations the source must not be too close to the instrument (Figure 239, p. 242).

The dose rate display (Figure 87, p. 86) shows two representations of the gamma dose rate:

Analog

A colored horizontal bar along a logarithmic axis ranging from 0.001 µSv/h to 10 Sv/h (1 Sv = 100 rem) across the upper part of the screen.

A vertical line marks the position of dose rate alarm threshold (see 6.33, p. 161 for setting the threshold).

If the dose rate rises above the threshold, the color of the bar representing the current dose rate changes.

Digital

Large digits and a dose rate unit in the screen's center.

The unit is adjusted to the order of magnitude of the dose rate (µSv/h, mSv/h, Sv/h) and reflects your preferences (see 6.31, p. 159).

- If your variant is equipped with a neutron detector, the current neutron rate is shown below the gamma dose rate.

If the dose rate rises above the overload threshold (see A.1, p. 237), the instrument's results are unreliable. This condition is displayed on the screen (Figure 88, p. 87).

We strongly recommend that you retreat from environments with radiation that high.

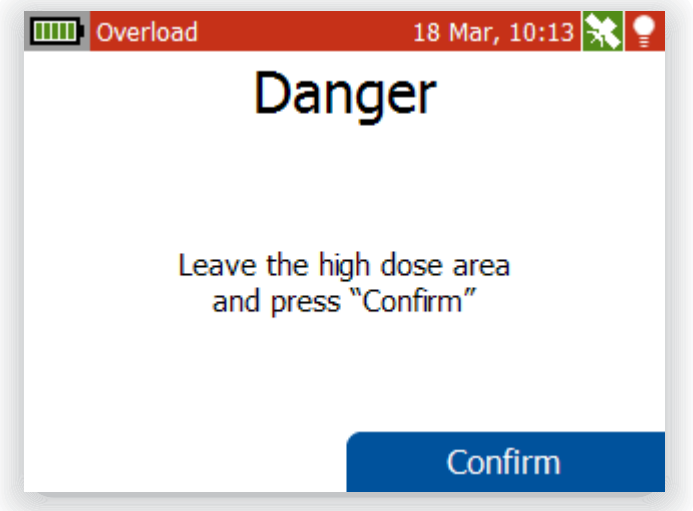

Figure 88. Detector overload

Move the FLIR identiFINDER R300 to a location with lower radiation and **then** press Confirm.

Settings and Commands

Finder

Switch to Finder mode (see 4.2, p. 88).

Options

Inspect and change options (see 6, p. 103).

4.2 Finder Mode

You can use the FLIR identiFINDER R300 in Finder Mode to locate a radiation source. Move the instrument around the vicinity of a suspected source and monitor the display, the red LED, vibrator, and beeper of the FLIR identiFINDER R300 for changes. The vibration, and especially the sound, get more “excited” the closer the instrument is to the source.

- Finder mode can be disabled (see 6.30, p. 157).
- You can switch off the LED, the vibrator, and the beeper (see 6.32, p. 160).

Immediately after switching to the Finder mode, the FLIR identiFINDER R300 begins a background measurement (Figure 89, p. 89).

- For better results, move the FLIR identiFINDER R300 away from suspected radiation sources during the background measurement.

The duration of the background measurement is shown below the chart showing the measurements.

If a background was measured since switching on the FLIR identiFINDER R300 and you don’t want to wait until the background is measured (not recommended), you can cancel the background measurement. The FLIR identiFINDER R300 will then use the most recent previous background measurement.

After the background measurement has finished, the Finder mode screen appears (Figure 90, p. 89).

- If your variant is equipped with a neutron detector, the current neutron rate is displayed at the bottom of the screen.

The current count rate is averaged for a period you can specify (see 6.30, p. 157). The average of the most recent period is visualized as a wide column along the right edge of the screen.

Narrow columns representing older periods fill the screen’s center from right to left, pushing the oldest periods off the screen’s left edge.

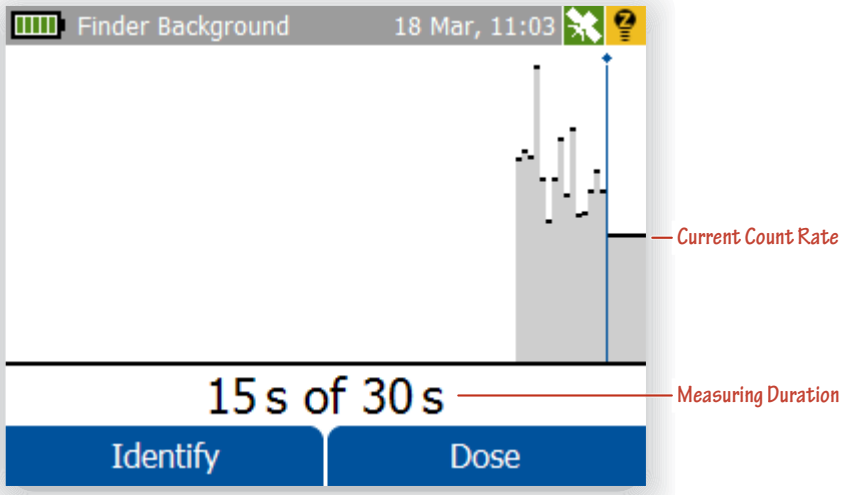

Figure 89. Finder mode: Initial background measurement

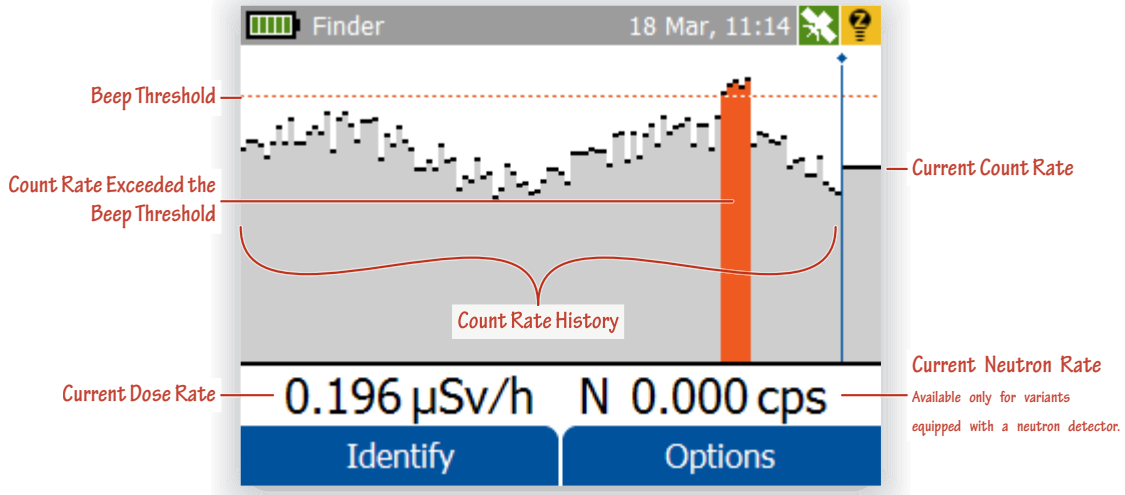

Figure 90. Finder mode: Continuous measurement

The vertical scaling of the chart is adjusted continuously to make best use of the available screen height. A dashed line above the chart indicates the adjustable (see 6.30, p. 157) threshold for audible feed back. If the count rate rises above this level, you get notified by the red LED, the vibrator, and the beeper. The sound frequency is proportional to the count rate, that is, the closer the instrument gets to the source the higher the tone.

You can mute the sound by pressing (I) for a moment. Muting remains in effect until you leave and re-enter the Finder mode and the background measurement is repeated.

Settings and Commands

Dose

Switch to Dose Rate mode (see 4.1, p. 86).

Identify

Switch to Identification mode (see 4.3, p. 90).

Options

Inspect and change options (see 6, p. 103).

4.3 Identification Mode

You can switch the FLIR identiFINDER R300 to Identification Mode to perform the actions necessary to identify the nuclides gamma radiation is originating from.

The instrument acquires a gamma spectrum for a duration you can specify (6.4, p. 116) and shows the progress and some parameters of the measurement (Figure 91, p. 90).

⚠ The spectrum acquired here overwrites the current contents of the spectrum viewer (6.2, p. 106). Data acquisition in the spectrum viewer, if any, is stopped.

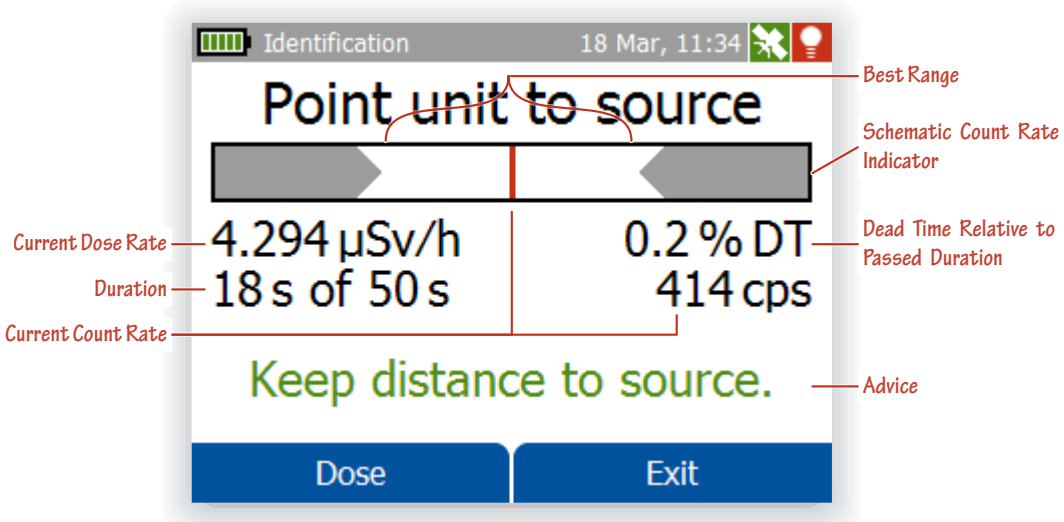

Figure 91. Identification Mode: Progress display during time limited data acquisition

The FLIR identiFINDER R300 achieves better identification results if the count rate is within a certain range shown in the center of in the indicator. While the current count rate is outside the desired range, advices are shown so you can shorten (Figure 92, p. 91) or lengthen (Figure 93, p. 91) the distance between the instrument and the radiation source.

If the acquisition is limited not by the time, but the number of counts (6.4, p. 116), the display looks slightly different (Figure 94, p. 92).

You should try to move the instrument into a good position although the advice on moving the instrument in a position for best identification is not shown in this mode to make room for the number of counts relative to the required minimum.

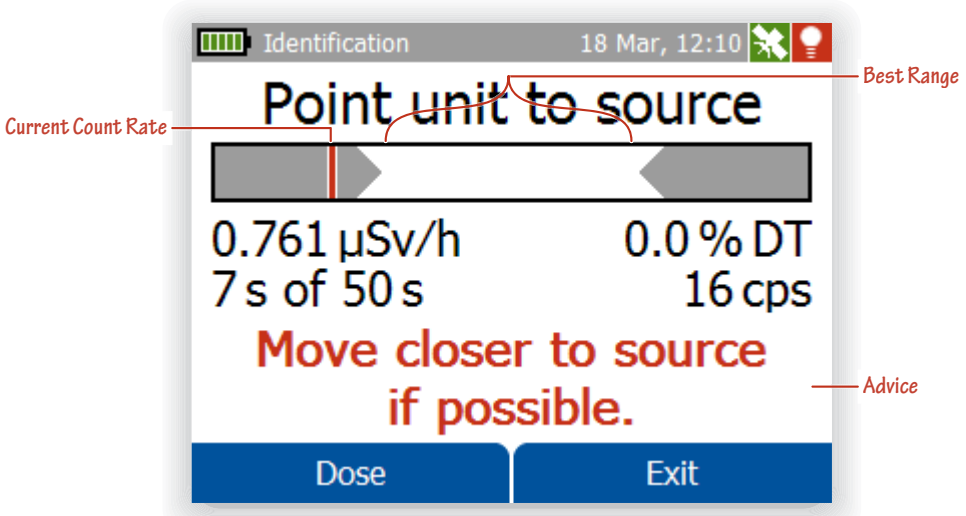

Figure 92. Identification Mode: Count rate too low for best results

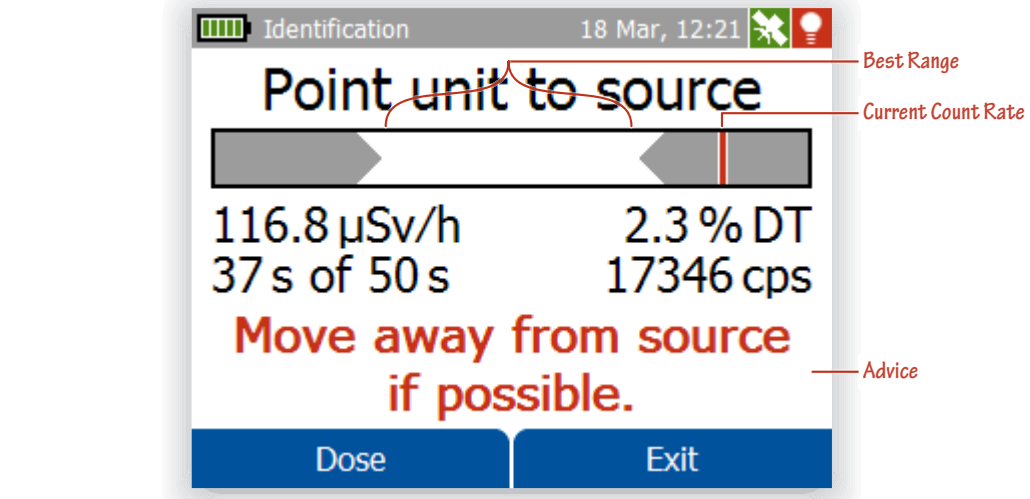

Figure 93. Identification Mode: Count rate too high for best results

The acquisition of data stops after the duration or count criterion (6.4, p. 116) is met or when you Exit. The FLIR identiFINDER R300 applies the identification algorithm and saves and displays the result (Figure 95, p. 92 and Figure 96, p. 93). If nuclides were identified, the results are saved. The reference number of the saved record is shown so you can refer to it for further processing.

You can specify whether confidence, usage, or severity are shown, see 6.4, p. 116.

Nuclides the identification algorithm did not recognize or those recognized but having their visibility suppressed (see 6.5, p. 118) are reported as “Unknown”.

Settings and Commands

Dose

Switch to Dose Rate mode (see 4.1, p. 86).

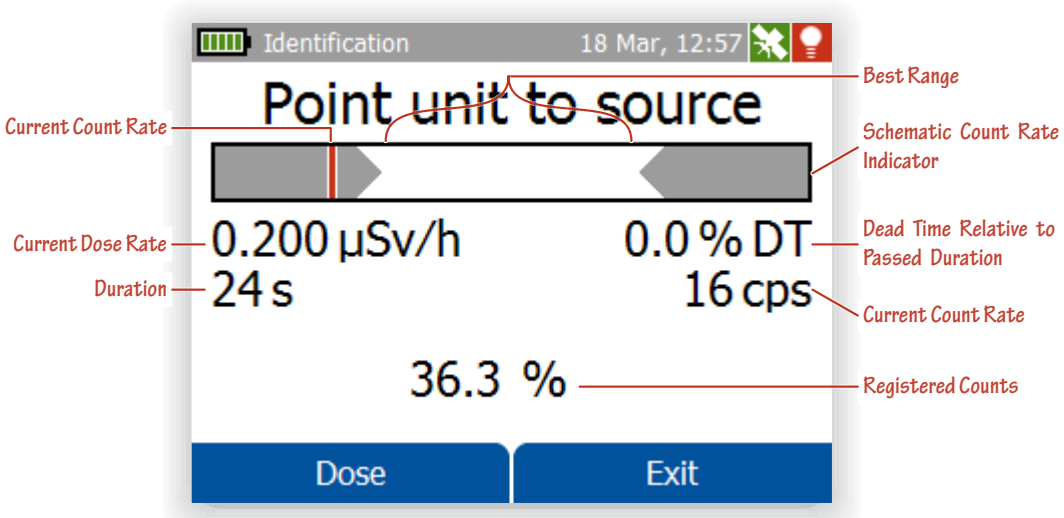

Figure 94. Identification Mode: Progress display during count limited data acquisition

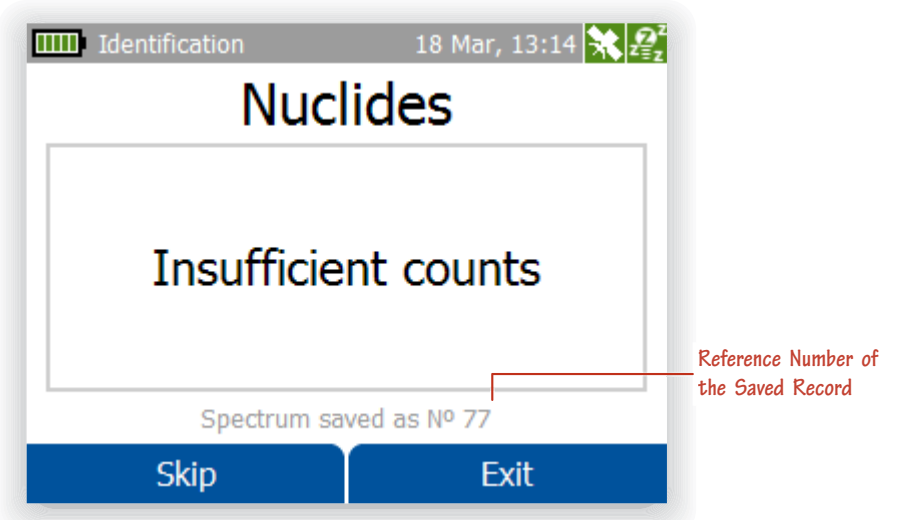

Figure 95. Identification Mode: Identification was not possible.

Start

Start the identification measurement.

Skip

Cycle the list of commands (see 2.2.1, p. 35).

Send

Go to Send Identification (see 6.21, p. 137) avoiding the detour around the normal options menu hierarchy. The current identification will be already chosen for sending.

Exit

Return to the previous mode.

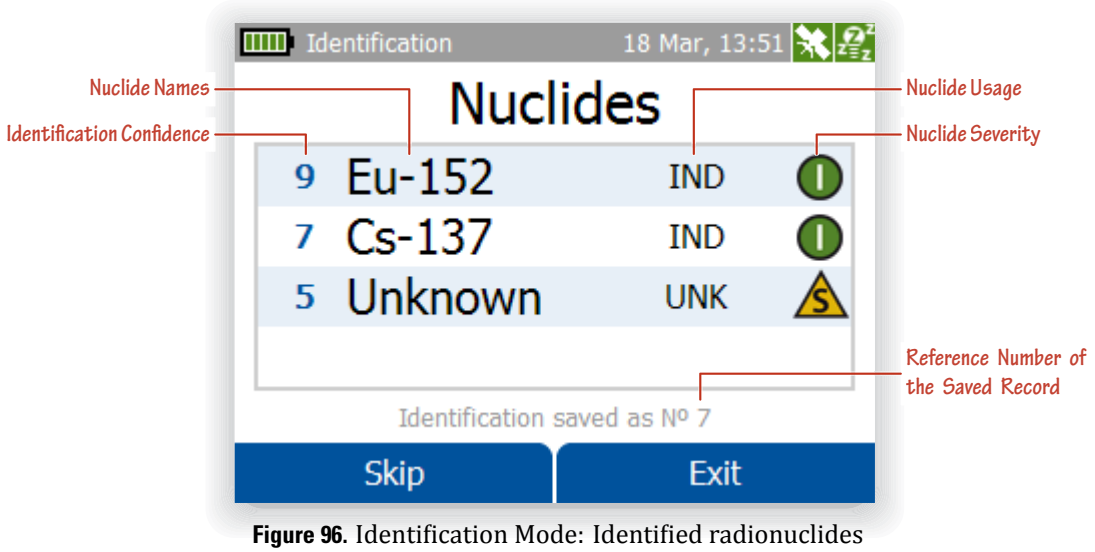

Figure 96. Identification Mode: Identified radionuclides

Continue

Acquire more data to improve the identification. The acquisition continues for the duration you specified (see 6.4, p. 116) no matter whether you limited the duration or the minimum number of counts for the initial acquisition.

Spectrum

Inspect the acquired spectrum.

⚠ This command is available only after you entered the password or if the password protection is off.

Please refer to 6.2, p. 106 for options and commands for spectrum viewing. After you return from the spectrum, you can Continue to acquire data, or Exit the identification mode.

4.4 Automated Mode

In automated mode, the FLIR identiFINDER R300 collects data for a radionuclide identification at specified time intervals or in response to a dose rate warning. You can switch this mode on or off and specify the interval (see 6.20, p. 135).

For each measurement, data will be collected until an instrument-specific number of gamma counts has been registered (cf. “Dynamic” identification duration, see 6.4, p. 116).

⚠ In low-radiation environments, this can take quite a while, even longer than the interval you specified. The next scheduled measurement will be omitted in such cases.

The start of an automated measurement will be announced 60 s in advance by a countdown shown instead of the current time on the display of the FLIR identiFINDER R300 (Figure 97, p. 94).

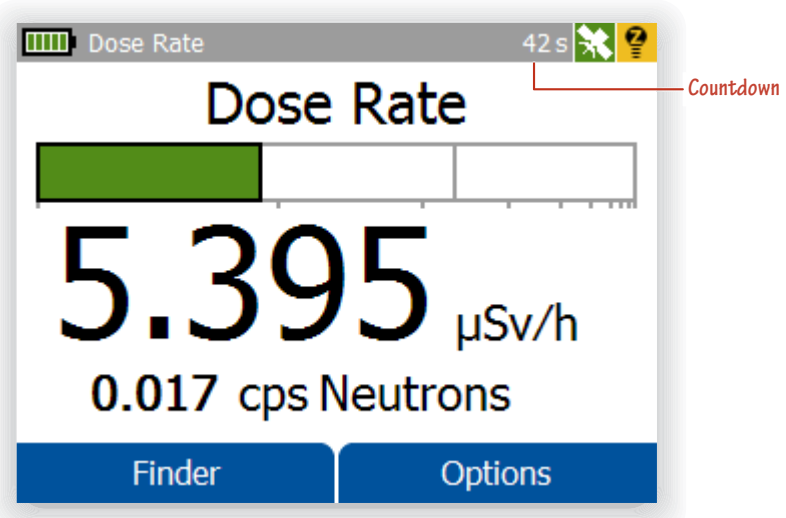

Figure 97. Countdown announcing the start of a scheduled measurement

Automatic identification measurements override other activities except alarms (see 5, p. 97). Automatic measurements are blocked during:

- Background measurements in Finder Mode (see 4.2, p. 88)
- A running self test (see 6.19, p. 134)

During these conditions, the countdown continues, but “Blocked” is shown instead of the countdown timer. Should the condition end before the scheduled time, the measurement starts. Otherwise, the measurement is omitted and a new attempt is made after the regular interval.

During the measurement, basic radiation data and a small spectrum with logarithmic scaling are shown (Figure 98, p. 94).

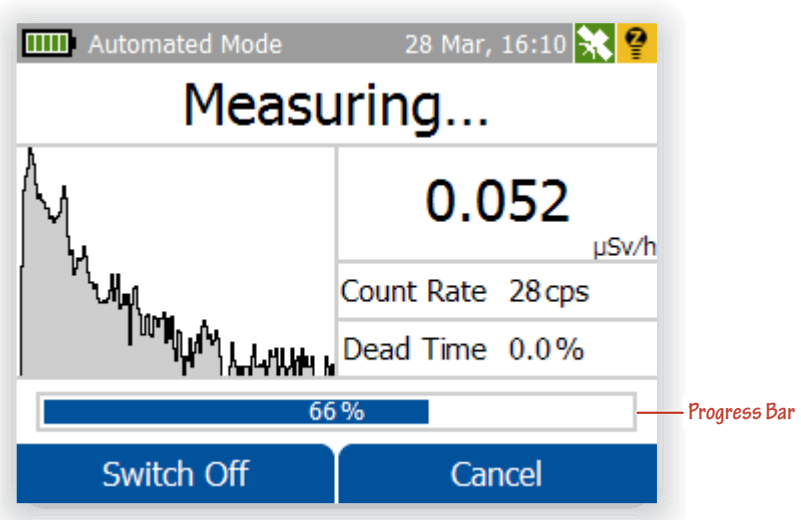

Figure 98. Automated measurement

Settings and Commands

Switch Off

Switch off automated mode.

⚠ Depending on your variant, this might require entering the password (2.2.7, p. 46).

Cancel

Cancel **this** measurement. The next measurement will start as scheduled.

Detected Nuclides

Once the Automated Mode measurement is complete, the FLIR identiFINDER R300 will report any nuclide(s) identified and indicate the reference number assigned to the stored results.

30 s

Initially, the only available command on the nuclide results screen shows a countdown timer starting at 30 s. When the timer expires, the FLIR identiFINDER R300 will return to the screen that was active before the Automated Mode measurement started. Pressing 30 s prior to the timer expiring will cancel the timer and the command will change to Exit.

Exit

Only appears if the results countdown timer was cancelled. Press to close the results screen and return to the screen that was active before the Automated Mode measurement started.

Results Storage

The results of the measurements are saved in the database of the FLIR identiFINDER R300. They are marked as being results of automated measurements (see 8.11, p. 199).

4.5 Remote-Controlled Spectrum Acquisition

While the FLIR identiFINDER R300 is connected to a computer, you can collect and analyze spectra via the web interface. This method of data acquisition for spectra interrupts other operations of the instrument.

⚠ Alarms will still be reported, if necessary.

During the acquisition, a message is shown (Figure 99, p. 96). You can stop it on the instrument with Stop or via the web interface with Stop (see 8.16, p. 209).

After the acquisition, the FLIR identiFINDER R300 resumes the mode it was in before. If the previous operation was interrupted during a time limited task like collecting background or identification data, it must start over again.

Web Spectrum
29 Mar, 12:30
Web Spectrum
The current acquisition of spectra via the web interface interrupts other operations. You can, however, stop the acquisition.
Stop

Figure 99. Message during remote-controlled spectrum acquisition

Chapter 5

FLIR identiFINDER R300 Alarms

If the FLIR identiFINDER R300 detects radiation above certain thresholds you can specify (see 6.33, p. 161), it raises an alarm. Alarms can be reported via several annunciators:

Main Display

Details of the alarm are always displayed on-screen, no matter which other activity was displayed at the time the alarm condition was met (for example, Figure 101, p. 99).

The screen backlight will be switched on if it timed out (6.9, p. 122).

The alarm details remain on the screen until you dismiss them.

Status Bar

If you dismiss the alarm details, the alarm and warning information is shown in the status bar along the display's top edge alternating with the normal information shown there (Figure 100, p. 98).

LED LEDs (Figure 7, p. 28) flash in several patterns.

Beeper

The beeper emits various sound patterns.

Vibrator

The vibrator shakes the instrument (and adds a little sound).

You can switch the LEDs, the beeper and the vibrator on or off (see 6.32, p. 160).

All alarms are stored in the FLIR identiFINDER R300's database, including date and time (always) and GPS coordinates (if switched on and available, see 6.11, p. 127).

You can review saved alarms via the web interface (8.13, p. 206) or delete them (6.17, p. 133)

Settings and Commands

Mute

Switch off the beeper and vibrator for the current alarm. The next alarm, if any, reactivates sound and vibration.

Acknowledge

Acknowledge the alarm.

The beeper and the vibrator are switched off (see "Mute" above) and the screen returns to the content displayed before the alarm was raised (Figure 100, p. 98). The alarm details, however, will alternate with the standard information in the title bar until the radiation drops below the alarm threshold.

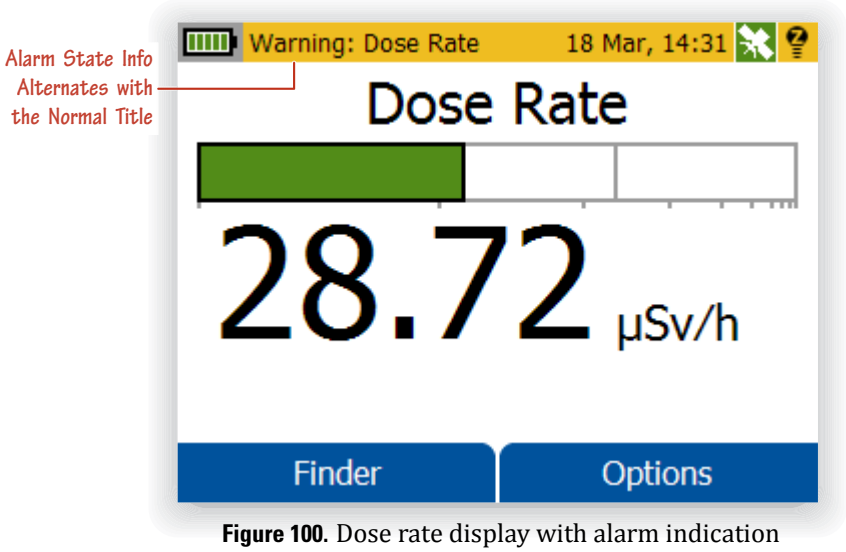

Figure 100. Dose rate display with alarm indication

5.1 Gamma Alarms

The FLIR identiFINDER R300 continuously compares the detected gamma radiation against thresholds you can specify for

- dose warning and dose alarm (see 6.33, p. 161)
- dose rate warning and dose rate alarm (see 6.34, p. 162).

When a threshold is exceeded, an appropriate warning or alarm is raised and reported visually (Figure 101, p. 99 and Figure 102, p. 99). The appropriate behavior of the annunciators is detailed in Figure 103, p. 100.

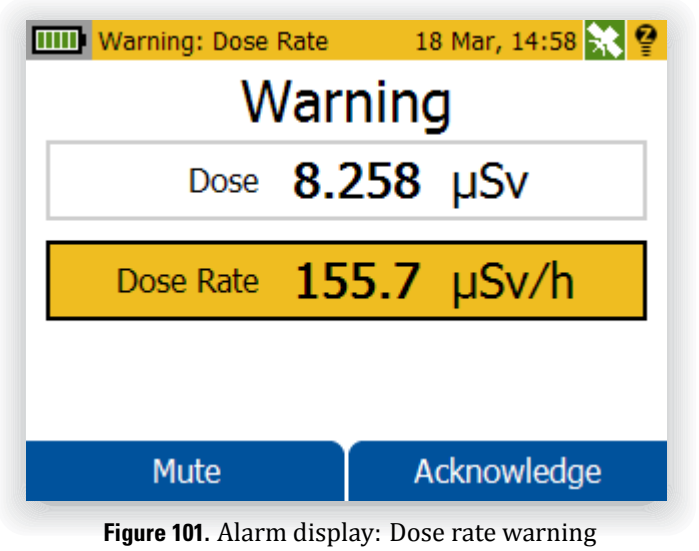

Figure 101. Alarm display: Dose rate warning

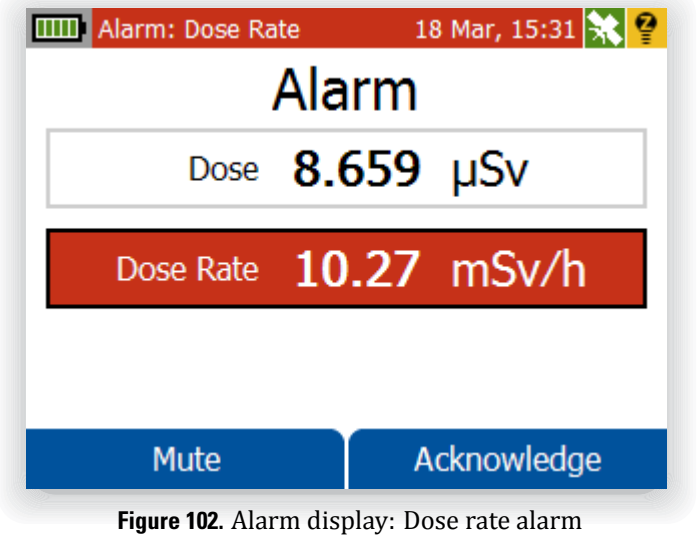

Figure 102. Alarm display: Dose rate alarm

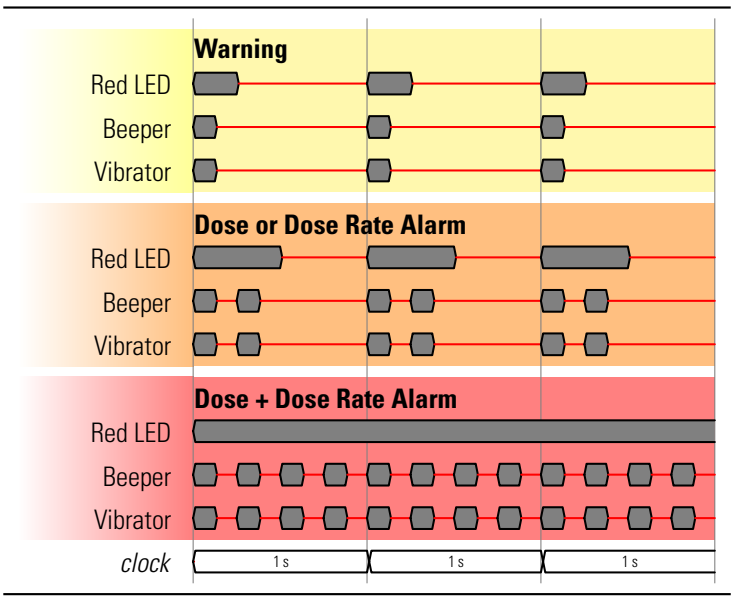

Figure 103. Gamma alarms as announced by the red LED, beeper, and vibrator

5.2 Neutron Alarms

♦ Available only for variants equipped with a neutron detector.

The FLIR identiFINDER R300 continuously compares the number of detected neutrons per given period against thresholds you can specify for warnings and alarms (see 6.35, p. 163).

When a threshold is exceeded, an appropriate warning or alarm is raised and reported visually (Figure 104, p. 101). The appropriate behavior of the annunciators is detailed in Figure 105, p. 101.

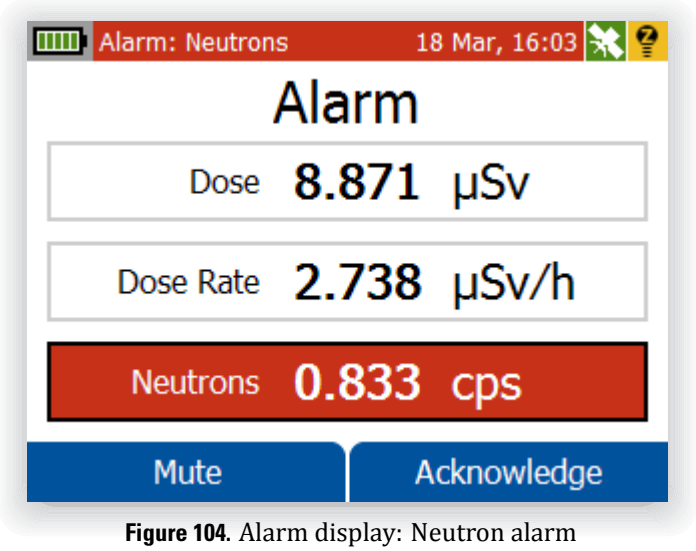

Figure 104. Alarm display: Neutron alarm

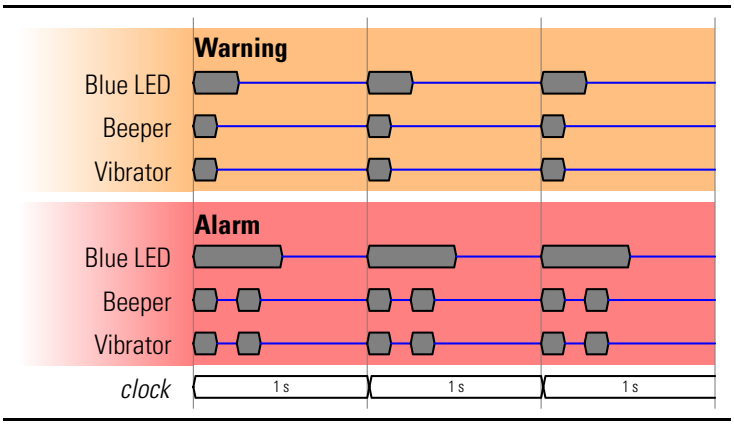

Figure 105. Neutron incidents as announced by the blue LED, beeper, and vibrator

5.3 Sigma Notifications

The FLIR identiFINDER R300 continuously monitors the radiation level and uses a smart algorithm to detect unusual increases. These events are announced as "σ notification" in the display's title bar (Figure 106, p. 102) and, optionally, via beeper and vibrator.

σ notifications are based on the increase of the radiation level over time. Other than the alarms described above, they do not depend on the absolute level.

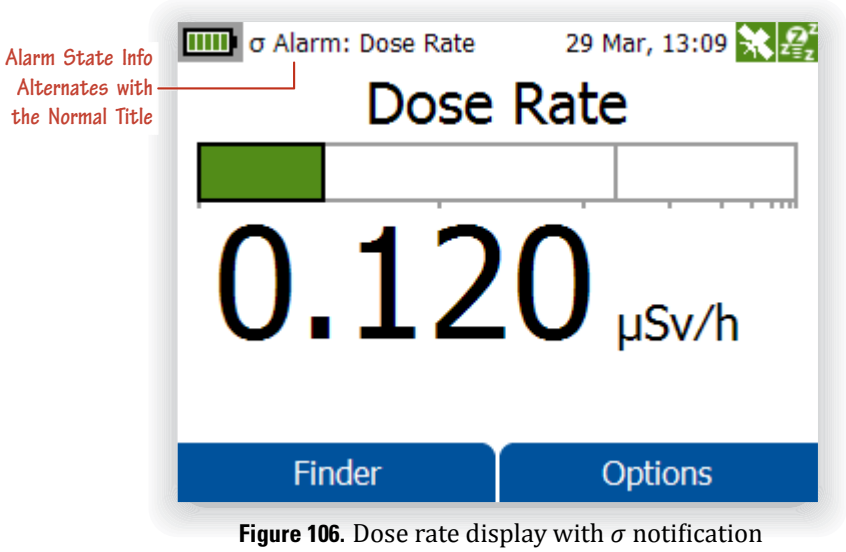

Figure 106. Dose rate display with σ notification

σ notifications are especially useful while you carry the instrument on your belt because the instrument calls for your attention by beeping and flashing upon the sudden increase of the radiation level.

You can activate the announcements and control the sensitivity (see 6.34, p. 162, 6.35, p. 163).

Chapter 6

FLIR identiFINDER R300 Menu Reference

This chapter provides detailed descriptions of the FLIR identiFINDER R300's vast number of settings that influence its behavior, and the commands for expert analyses and advanced operations.

You can access these commands and settings by navigating the menu hierarchy. Depending on your variant, there are different entry points for the menu hierarchy.

Some FLIR identiFINDER R300 variants provide easy access to a few commands and settings without password. The complete menu listed under 6.1, p. 103 is available as well.

Main Menu
- Advanced Menu ..... see 6.1, p. 103
- Clock Settings ..... see 6.10, p. 125
- Current Alarm State ..... see 6.36, p. 165
- Connectivity Options ..... see 6.1, p. 104

6.1 Complete Option Menus (Outline)

All FLIR identiFINDER R300 variants provide access to the complete set of commands and settings. Usually, you have to enter a password (see 2.2.7, p. 46) before access.

Options Menu
- More Options
  - Spectrum ..... see 6.2, p. 106
    - Calibration ..... see 6.3, p. 115
  - Identification Options
    - Identification Settings ..... see 6.4, p. 116
    - Nuclide Visibility ..... see 6.5, p. 118
    - Nuclide Usage ..... see 6.6, p. 119
    - Nuclide Severity ..... see 6.7, p. 120

- Presets ..... see 6.8, p. 121
- Bluetooth SPP ♦
  - Bluetooth SPP Status ♦ ..... see 6.23.1, p. 141
  - Bluetooth SPP Settings ♦ ..... see 6.23.2, p. 142
- Advanced Options
  - General Options
    - Display Settings ..... see 6.9, p. 122
    - Clock Settings ..... see 6.10, p. 125
    - GPS Settings ..... see 6.11, p. 127
  - Maintenance
    - Change Password
      - Set Password ..... see 6.12, p. 128
      - Clear Password ..... see 6.13, p. 129
    - Show Status ..... see 6.14, p. 130
    - Reset Factory Settings ..... see 6.15, p. 132
    - Erase Data
      - Erase All Spectra ..... see 6.16, p. 133
      - Erase All Alarms ..... see 6.17, p. 133
      - Erase All Screenshots ..... see 6.18, p. 134
    - Self Test ..... see 6.19, p. 134
  - Data Logging
    - Automated Mode Settings ..... see 6.20, p. 135
  - Connectivity Options
    - Send Data ♦
      - Send Identification ♦ ..... see 6.21, p. 137
      - Send Spectrum ♦ ..... see 6.22, p. 140
    - Bluetooth Periphery ♦ ..... see 6.23.3, p. 144
    - Remote Server Settings ..... see 6.24, p. 149
    - Mass Storage ..... see 6.25, p. 150
    - Network ..... see 6.26, p. 152
    - Report Settings ..... see 6.27, p. 153
    - Download Settings ..... see 6.28, p. 154
- Gamma, Neutron Counters ..... see 6.29, p. 155
- Finder Settings ..... see 6.30, p. 157
- Dose Rate Settings ..... see 6.31, p. 159

- Alarm Options
  - Alarm Indicators ..... see 6.32, p. 160
  - Dose Alarm Thresholds ..... see 6.33, p. 161
  - Dose Rate Alarm Thresholds ..... see 6.34, p. 162
  - Neutron Alarm Thresholds ♦ ..... see 6.35, p. 163
  - Current Alarm State ..... see 6.36, p. 165

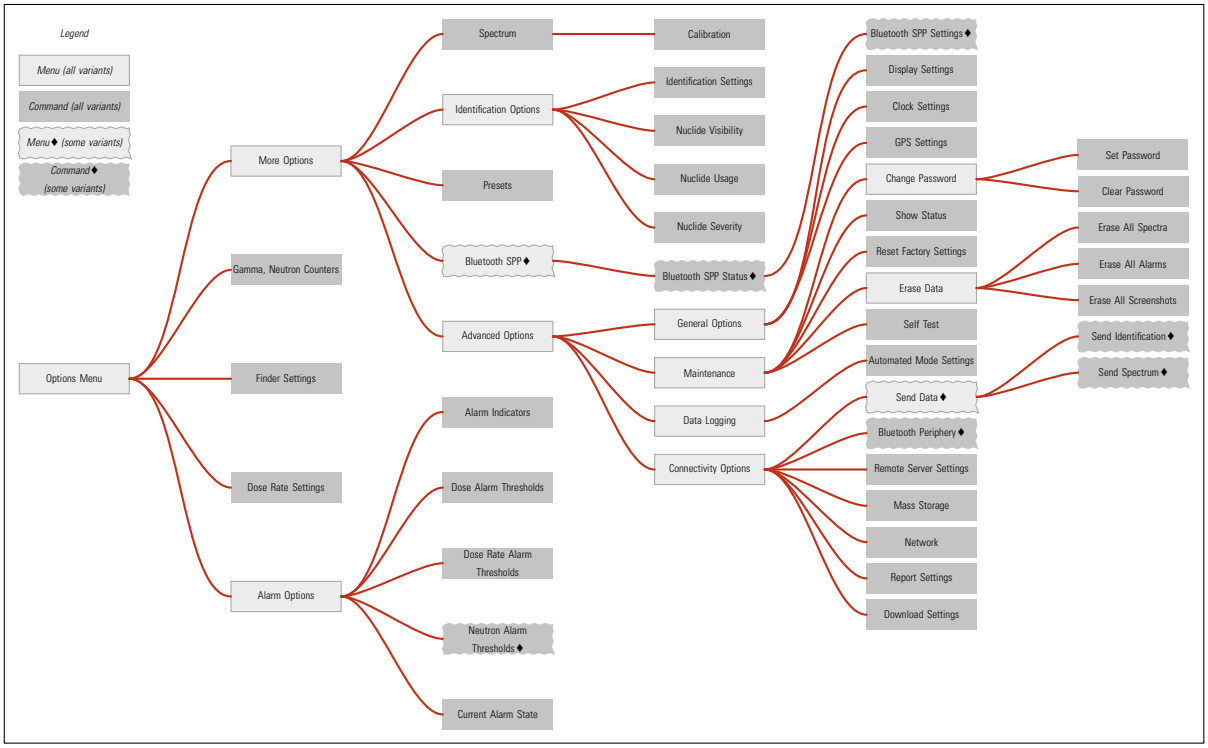

Figure 107. Hierarchy of the FLIR identiFINDER R300 menu

6.2 Spectrum

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Spectrum

Live Spectrum (p. 209)

This command displays a spectrum and offers access to the settings that influence the display. You can acquire data ad hoc or load saved spectra from the database and inspect them with different scalings.

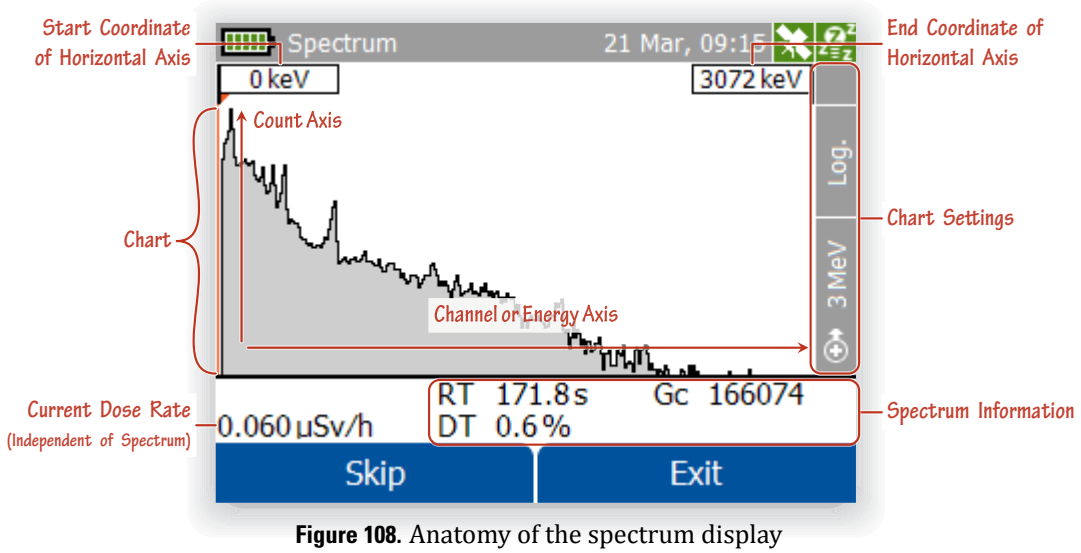

Figure 108. Anatomy of the spectrum display

The largest part of the screen is used for the spectrum chart (Figure 108, p. 106). Various status information is shown around the chart (Figure 109, p. 107).

Acquisition Duration

The time passed while acquiring data for the spectrum as real or live time.

Dead Time

The dead time as a percentage of the real time.

Gamma Count

The total gamma counts comprising the spectrum.

Neutron Count

The total number of neutrons counted while acquiring data for the spectrum.

♦ Available only for variants equipped with a neutron detector.

Scaling

The current scaling of the vertical axis (linear, logarithmic, square root, ...).

Horizontal Coordinates

The coordinates of the leftmost and rightmost values currently shown on the horizontal axis; depending on current zoom state and cursor position.

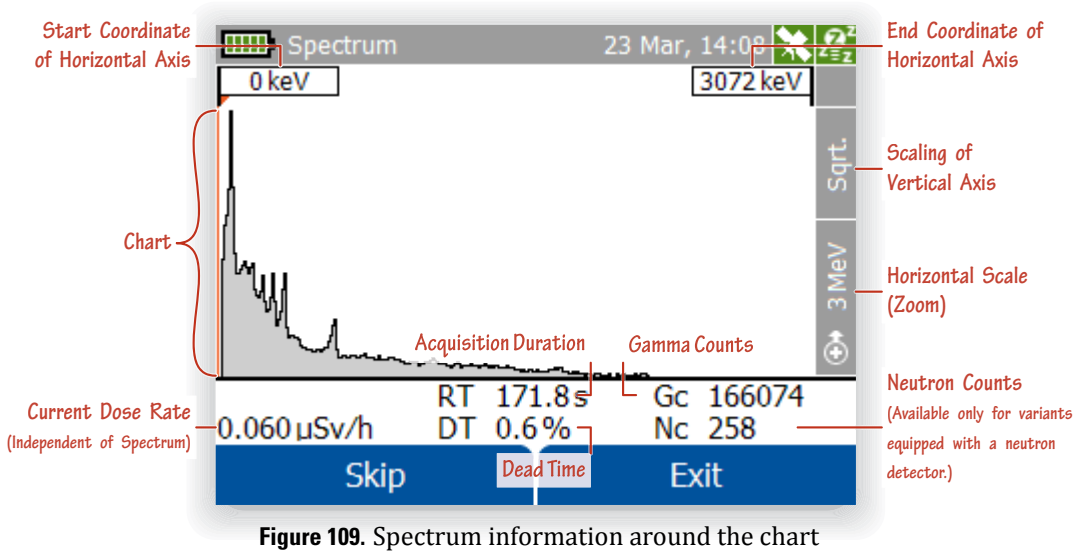

Figure 109. Spectrum information around the chart

Settings and Commands

Skip

Cycle the list of commands (see 2.2.1, p. 35).

Press (I) to exit to the superior screen.

Start ⇋ Stop

Start or stop the acquisition of data for the spectrum. The current status is shown in the center of the chart (Figure 110, p. 107), which updates live with the acquired data.

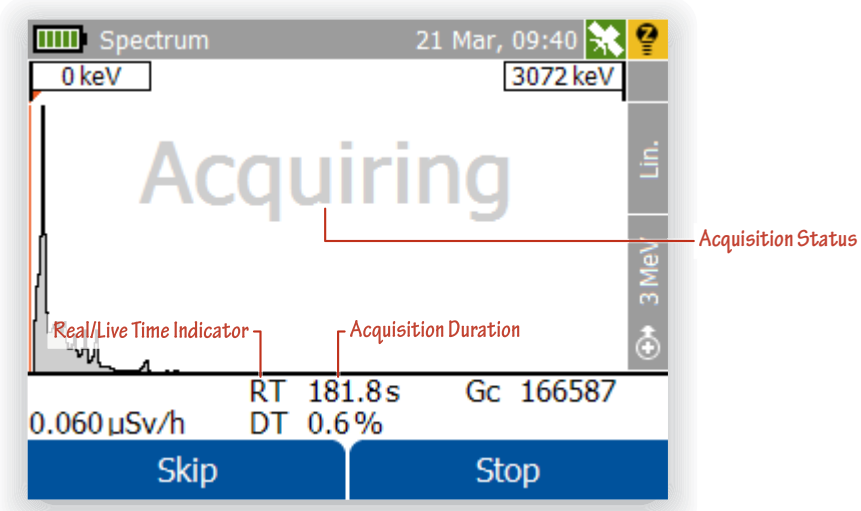

Figure 110. Acquiring spectrum data

⚠ You cannot start the acquisition if the duration you preset (see 6.8, p. 121) for acquisition has ended. This is indicated by a remaining acquisition duration (Figure 111, p. 108) of 0. If you try to start nevertheless, your FLIR identiFINDER R300 beeps.

The current spectrum is not cleared before recording data, that is, new measurements are added to the existing spectrum. To record a pristine spectrum, use the Clear command first (see below).

The acquisition of spectrum data stops in one of the following events:

- You end the acquisition with Stop.
- The end of the real or life duration you specified (see 6.8, p. 121) is reached. You know the duration is preset because of the indicator (Figure 111, p. 108) and the timer is counting down.

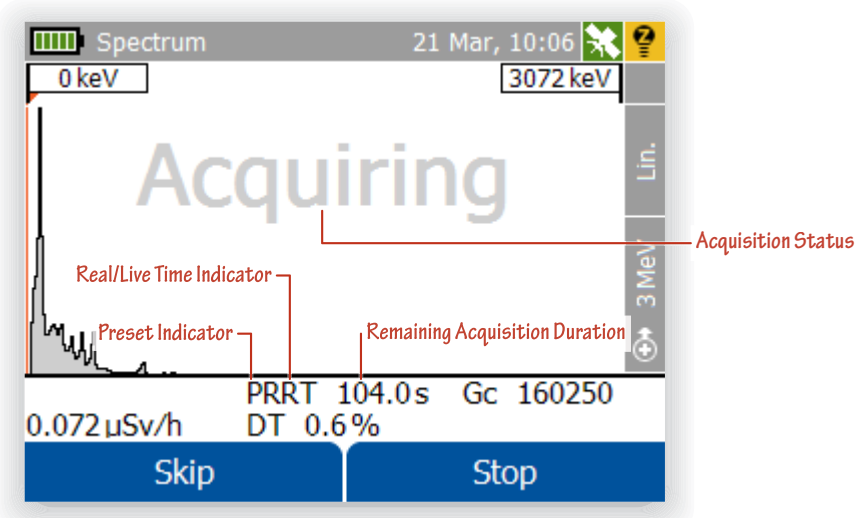

Figure 111. Acquiring spectrum data while the duration is preset

- You switch the FLIR identiFINDER R300 to Identification Mode (see 4.3, p. 90). This discards the current spectrum and loads the spectrum from the identification process into the spectrum viewer.
- You Exit the spectrum view.

Exit

Return to the superior menu.

If you try to exit during data acquisition, you will be asked to confirm the command because the acquisition will stop.

Spectrum Cursor

You can place a cursor for detailed inspection along the spectrum's horizontal axis. The cursor position is represented on screen by a vertical line with a down-pointing triangle on top (Figure 112, p. 109).

The number of counts at the cursor's position is shown above the triangle together with the position as channel number (Figure 112, p. 109) or energy (Figure 113, p. 110).

The vertical scaling is adjusted to make best use of the available screen height. If you zoom in (see below), this may cause vertical rescaling if you move the cursor between sections with high peaks or noise.

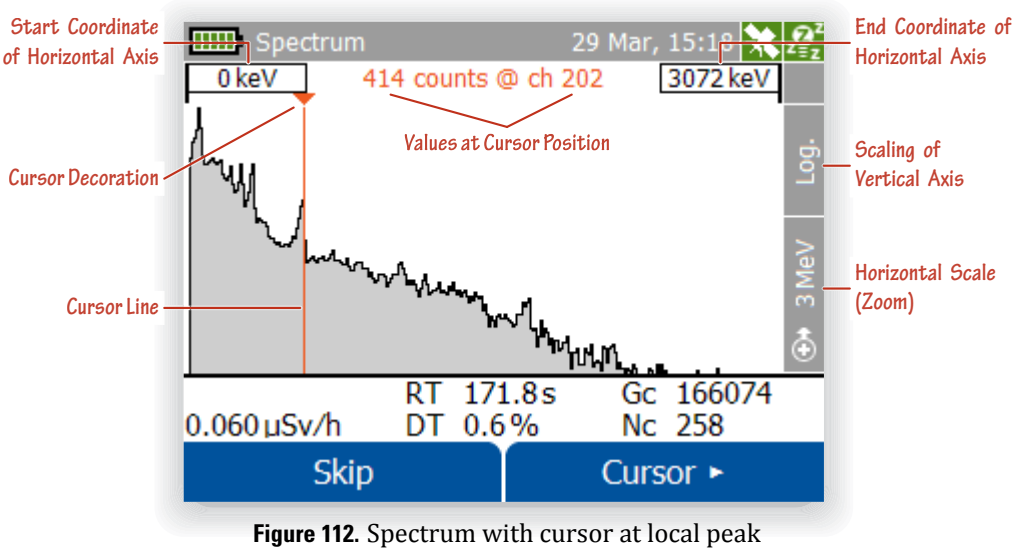

Figure 112. Spectrum with cursor at local peak

◀ Cursor Left

Move the cursor to the left. If you pass the left edge, the cursor wraps around to the right edge.

Cursor Right ▶

Move the cursor to the right. If you pass the right edge, the cursor wraps around to the left edge.

Region of Interest (ROI)

You can mark a part of a spectrum for closer inspection. The region of interest is defined by its left and right boundaries which you can set with the cursor (Figure 113, p. 110).

Mark Channel

Define a boundary of the ROI at the current cursor position. Up to two boundaries are possible.

It does not matter which boundary of the ROI you mark first.

1. If this is the first marker you set, it will be decorated with diamonds (Figure 114, p. 110).
2. If this is the second marker you set, both markers will be decorated with triangles pointing into the defined ROI (Figure 115, p. 111).
3. If you try to set a third marker, the old marker closest to the current position will be removed before setting the new marker.

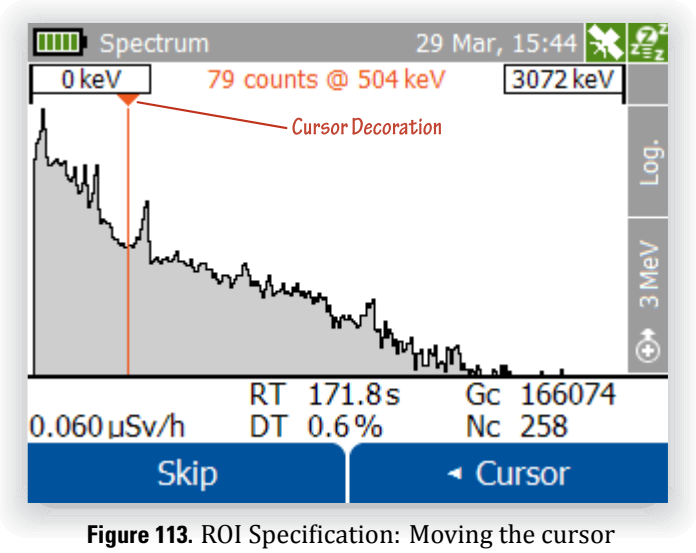

Figure 113. ROI Specification: Moving the cursor

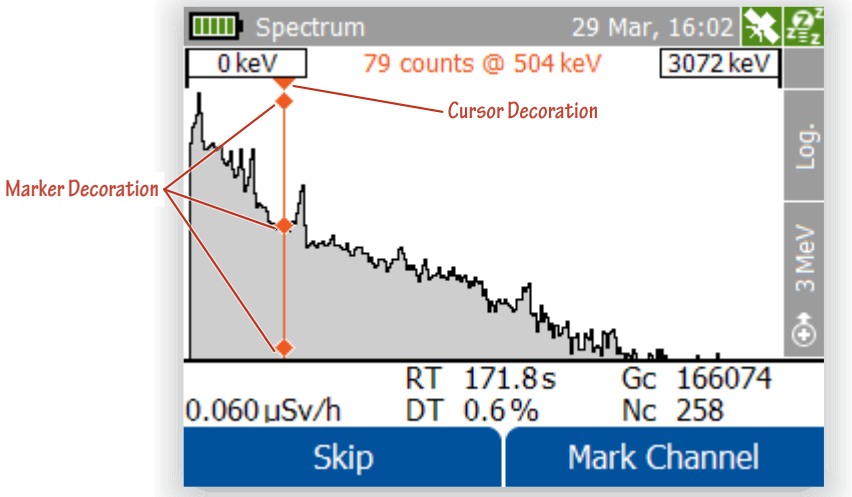

Figure 114. ROI Specification: Marking the first ROI boundary

Clear Markers

Clear all markers.

Zoom 3 MeV ⇋ Zoom 1.5 MeV ⇋ Zoom 1:1 ⇋ Zoom ROI

Choose a horizontal display scale and range.

Zoom 3 MeV

All the channels (3 MeV range) of the spectrum scaled to fit into the available screen width (Figure 116, p. 111). If you move the cursor off-screen, it will re-appear on the other side.

Zoom 1.5 MeV

The first half of the channels (1.5 MeV range) of the spectrum scaled to fit into the available screen width (Figure 117, p. 112). If you move the cursor off-screen, it will re-appear on the other side.

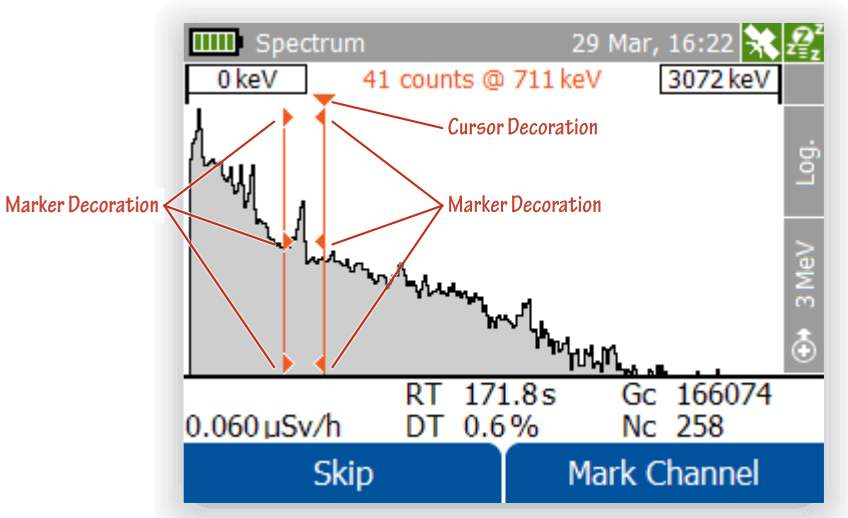

Figure 115. ROI Specification: Marking the second ROI boundary

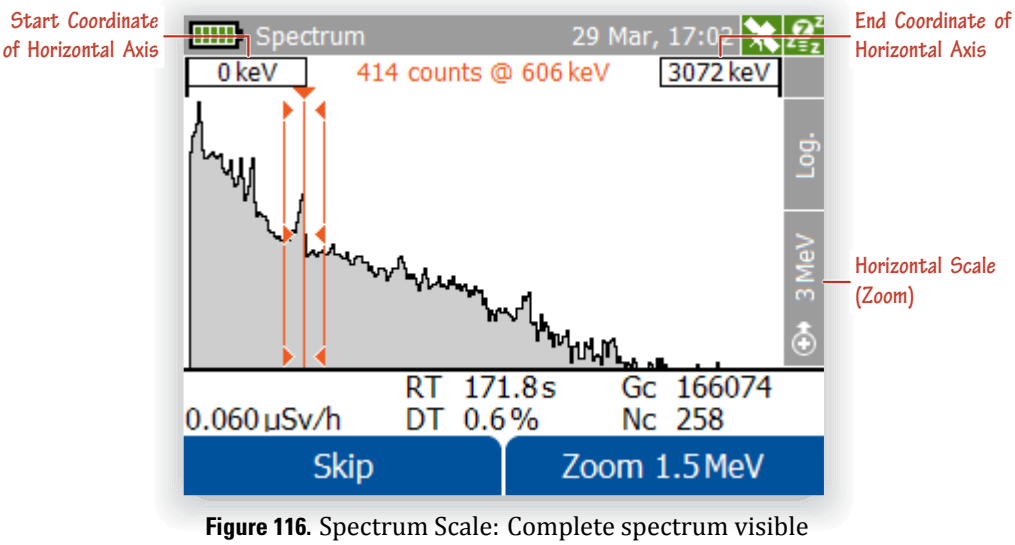

Figure 116. Spectrum Scale: Complete spectrum visible

Zoom 1:1

Every spectrum channel is represented by one screen pixel (Figure 118, p. 112). If you move the cursor off-screen, the spectrum scrolls with the cursor. After the cursor reaches the end of the spectrum, it will re-appear on the other side.

Zoom ROI

The spectrum is scaled to fit the ROI into the available screen width (Figure 119, p. 113). If you try to move the cursor off-screen, the scale is changed to ensure the cursor remains visible.

Clear

Clear the current spectrum. You have to confirm this command with Clear or change your mind with Cancel.

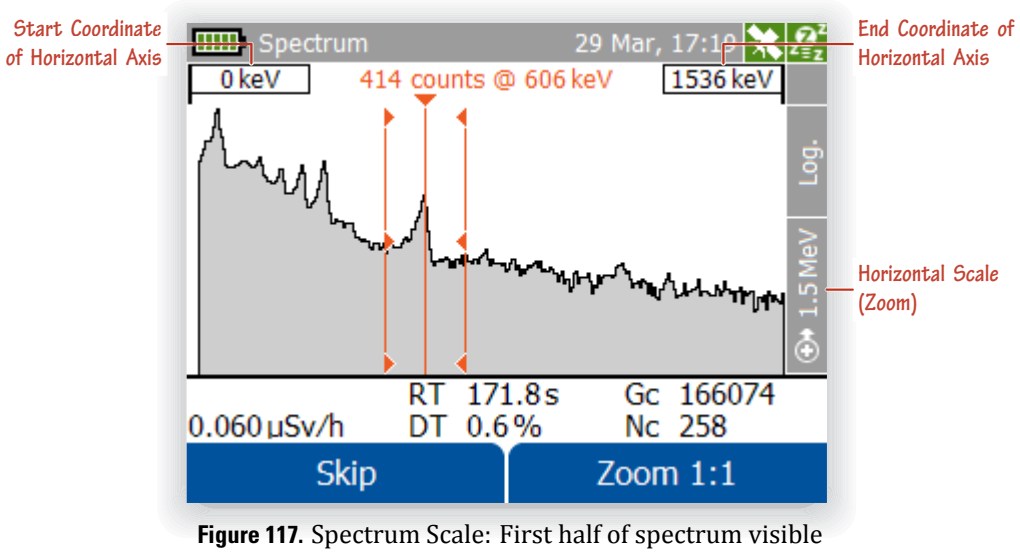

Figure 117. Spectrum Scale: First half of spectrum visible

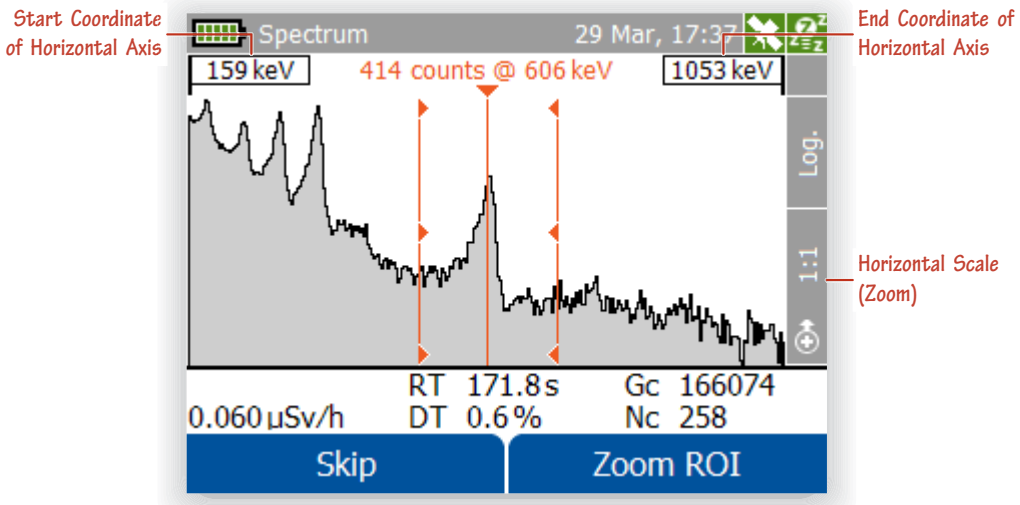

Figure 118. Spectrum Scale: One display pixel equals the width of one spectral channel

⚠ This command clears the current spectrum but does not stop the current acquisition of data, if any.

Save

Save the current spectrum. The reference number of the saved spectrum will be shown until you acknowledge it.

If there is not enough free memory to store the spectrum, you will be informed. You can delete saved spectra (see 6.16, p. 133) if necessary.

Load

Load a saved spectrum.

You can choose from all the saved spectra. While you step through the list, the saving date of the spectrum is displayed (Figure 120, p. 113) to assist you with making a selection.

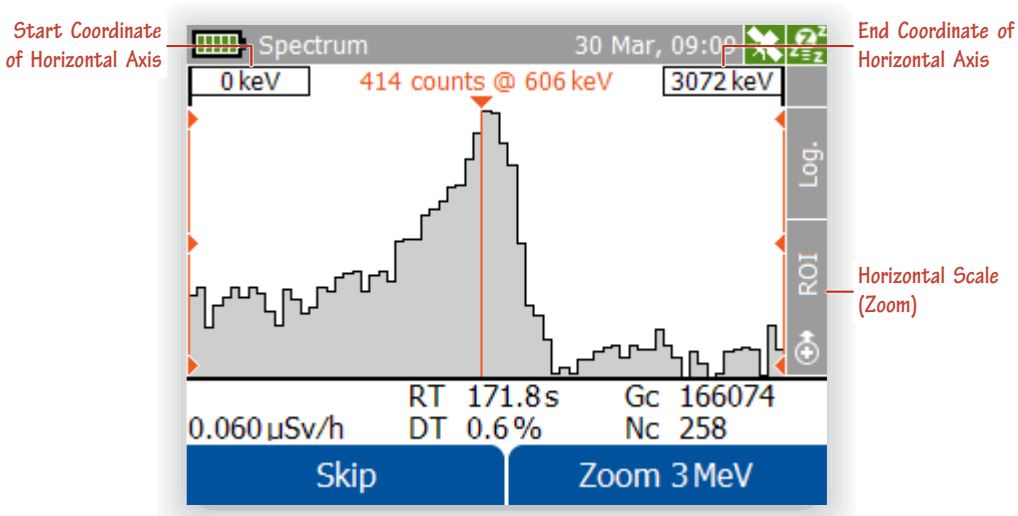

Figure 119. Spectrum Scale: The defined ROI fits into the available screen width

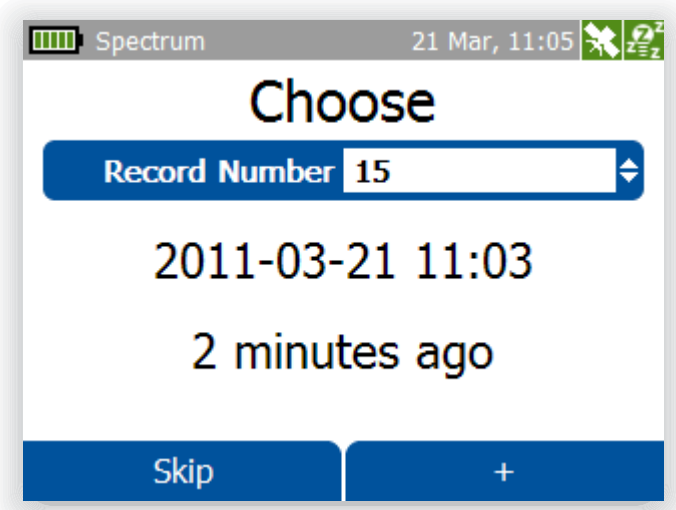

Figure 120. Choosing a saved spectrum to be loaded for display

To cancel loading a spectrum, press (I).

If you load a spectrum while acquiring data, the current spectrum is discarded but the acquisition is not stopped. That is, fresh data are added to the loaded spectrum.

Identify

Let the FLIR identiFINDER R300 apply its identification algorithm to the current spectrum.

A list of identified nuclides, if any, is displayed and saved (Figure 121, p. 114).

Nuclides the identification algorithm did not recognize or those recognized but having their visibility suppressed (see 6.5, p. 118) are reported as “Unknown”.

You can specify whether confidence, usage, or severity are shown, see 6.4, p. 116.

Exit

Return to the spectrum display.

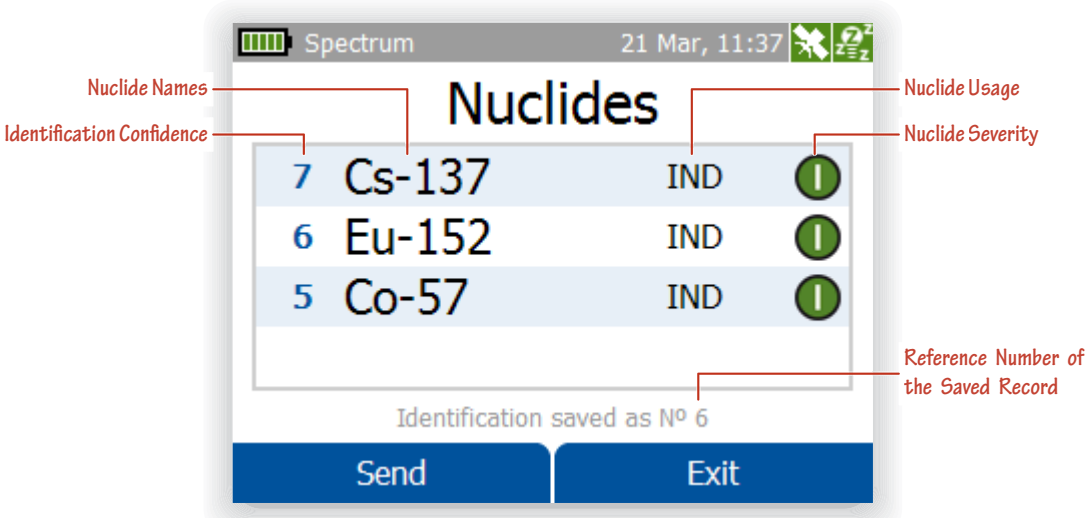

Figure 121. Radionuclides identified in the current spectrum

Send

Go to Send Identification (see 6.21, p. 137), avoiding the detour around the normal options menu hierarchy. The current identification will be already chosen for sending.

Logarithmic ⇋ Linear ⇋ Square Root ⇋ Ymax/2 ⇋ Ymax/4

Cycle the methods for the vertical scaling. The current method is indicated in the status bar right of the chart (Figure 112, p. 109). The method you get after pressing the key is shown in the key description.

For logarithmic, linear, and square root scaling the maximum peak is rendered so it makes best use of the available screen height.

The other scalings stretch the rendering so that only the given bottom fraction of the spectrum is visible. Higher peaks are cut off.

Energy ⇋ Channel

Cycle the options for the display of horizontal coordinates in the spectrum. The current unit and range is shown above the chart (Figure 112, p. 109 and Figure 110, p. 107). The variant you get after pressing the key is shown in the key description.

Calibration

View a detail spectrum to check the calibration. Please refer to 6.3, p. 115 for details.

LT ⇋ RT

Specify the type of display for the duration of data acquisition.

You can specify real or live time display. The current setting is shown below the chart (Figure 110, p. 107).

No matter what you specify here, the dead time (DT) is always shown as a percentage of the real time.

Send

Save the spectrum and go to Send Spectrum (see 6.22, p. 140), avoiding the detour around the normal options menu hierarchy. The current spectrum will be already chosen for sending.

Preset

Go to the Presets (see 6.8, p. 121), avoiding the detour around the normal options menu hierarchy.

6.3 Calibration

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Spectrum (p. 106) ➤ Calibration

The calibration check screen (Figure 122, p. 116) shows a zoomed spectrum (see 6.2, p. 106) of a certain peak and some parameters describing the peak. The center of the horizontal axis is positioned at the theoretical peak position and the vertical axis is scaled logarithmically.

Upon entering this screen, a peak of ^{137}Cs is shown. You can choose other nuclides from a list of nuclides commonly used for calibration (Table 1, p. 115).

Table 1. Typical Calibration Peaks

Nuclide	Peak [keV]	
^{137}Cs	661.65	
^{40}K	1460.8	
^{232}Th	2615	
^{22}Na (ANNH)	511	Annihilation radiation also originates from other sources like ^{11}C, ^{13}N, ^{15}O, ^{18}F, ^{68}Ga, or ^{82}Rb.
^{54}Mn	834.838	
^{60}Co	1173	
^{241}Am	59.54	
^{238}U (DU)	1001	
^{235}U (HEU)	185.7	

Refer to Appendix C, p. 259 for details about the nuclides.

Make sure the source selected to be checked is present when using this command.

For best results, move the instrument to a low-radiation environment to check the calibration.

Data for this spectrum are continuously acquired beginning with an empty spectrum upon entering this screen or after you cleared the data (see below).

Settings and Commands

Nuclide

The nuclide used for the calibration check, refer to Table 1, p. 115.

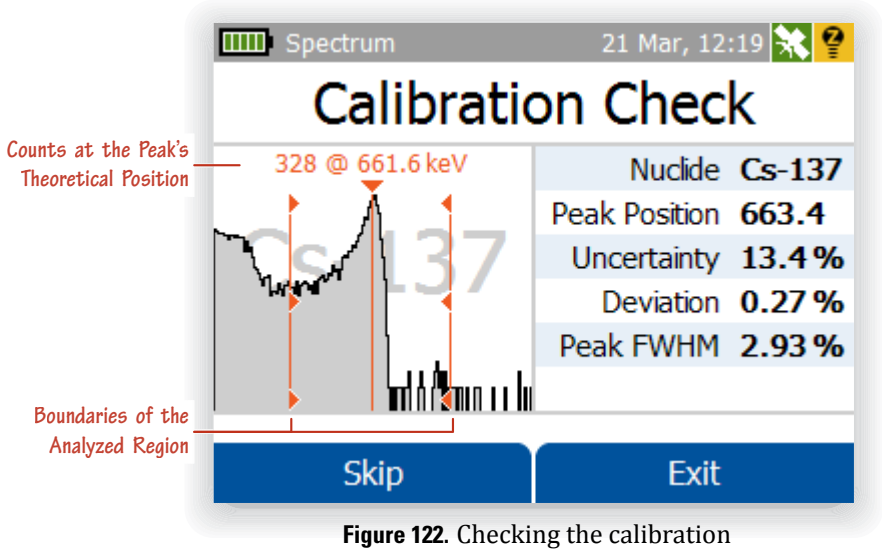

Figure 122. Checking the calibration

Peak Position

The position of the measured peak (keV).

Uncertainty

The statistical uncertainty of the peak. This value decreases with an increasing number of counts, you can expect reliable results for values below 0.5 %.

Do not trust the figures alone, watch the spectrum chart to verify the existence of a peak.

Deviation

The measured peak's position deviation from the theoretical position.

Peak FWHM

The full width at half maximum height of the measured peak.

K-40 ⇋ Th-232 ⇋ Na-22 ⇋ Mn-54 ⇋ Co-60 ⇋ Am-241 ⇋ DU ⇋ U-235 ⇋ Cs-137

Cycle through the nuclides available for calibration check. The command description names the nuclide you get after executing the command, the current nuclide is shown next to the spectrum chart.

Clear

Clear the acquired data. The acquisition of data is not interrupted.

Exit

Return to the superior menu.

6.4 Identification Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Identification Options (p. 103) ➤ Identification Settings

Settings (p. 180) ➤ General (p. 184) ➤ Identification (p. 184)

This screen (Figure 123, p. 117) groups options that influence the identification of nuclides (see 4.3, p. 90).

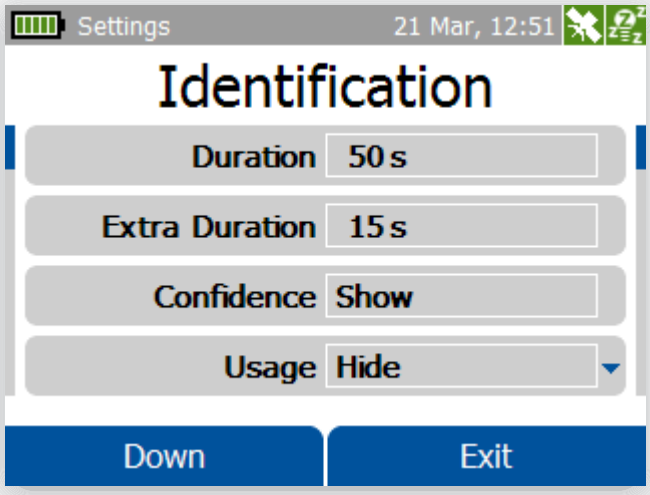

Figure 123. Upper items of the identification settings

Settings and Commands

Duration

Specify the duration of data acquisition for the nuclide identification. Allot more time to the identification measurement if:

- you want to identify a weak source.
- you are at a place with high background radiation.
- you want to identify a mixture of radionuclides.
- you want to identify a shielded source.

You can specify the durations "Dynamic" or from 1 s to 999 s (16 m 39 s).

If you specify a duration of "Dynamic", the FLIR identiFINDER R300 will collect data until 4800 gamma counts have been registered. This may take a while especially if the radiation level is near the background level.

Extra Duration

Specify the duration of continued data acquisition for the nuclide identification. This duration is applied when you use the Continue command in identification mode (see 4.3, p. 90), no matter whether you specified the duration or the minimum number of counts above.

You can specify an extra duration from 1 s to 999 s (16 m 39 s).

Confidence

Specify if you want the level of confidence of a nuclide identification shown or hidden in identification results. The confidence is expressed on a scale from 0 (poor) to 10 (excellent).

Usage

Specify if you want the usage of an identified nuclide shown or hidden in identification results (for details refer to 6.6, p. 119 or C, p. 259).

Severity

Specify if you want the severity of an identified nuclide shown by icons or hidden in identification results (for details refer to 6.7, p. 120 or C, p. 259).

- Innocent
- Suspicious
- Threatening

U, Pu

Specify whether all uranium isotopes and all plutonium isotopes, respectively, should be identified together as element (uranium) or separately as nuclides (^{235}U, ^{238}U, etc.).

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.5 Nuclide Visibility

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Identification Options (p. 103) ➤ Nuclide Visibility

Settings (p. 180) ➤ Nuclides (p. 193)

Built into the FLIR identiFINDER R300 is a library used to identify the nuclides causing gamma radiation. Please refer to Appendix C, p. 259 for further information about the nuclides in this library.

You can specify which nuclides should be included in the display of identification results (Figure 124, p. 119).

Settings and Commands

Nuclides…

Choose one from the list of nuclides to specify whether you want it to be shown or suppressed in identification results.

Suppressed nuclides are reported as “Unknown” if recognized by the identification algorithm.

Skip

Cycle the list of commands (see 2.2.1, p. 35).

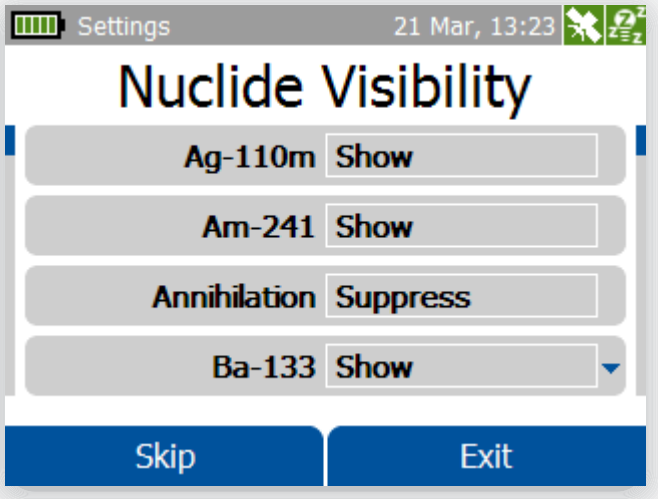

Figure 124. Top of the nuclide list used by the identification algorithm

Down, Up, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.6 Nuclide Usage

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Identification Options (p. 103) ➤ Nuclide Usage

Settings (p. 180) ➤ Nuclides (p. 193)

Built into the FLIR identiFINDER R300 is a library used to identify the nuclides causing gamma radiation. Please refer to Appendix C, p. 259 for further information about the nuclides in this library.

Every nuclide has associated information about its occurrence or field of application which you can have shown in identification results (Figure 96, p. 93). You can adapt the usage for all the nuclides in the library according to your needs with this command (Figure 125, p. 120).

Settings and Commands

Nuclides...

Choose one from the list of nuclides to edit the associated usage (see C, p. 259).

Skip

Cycle the list of commands (see 2.2.1, p. 35).

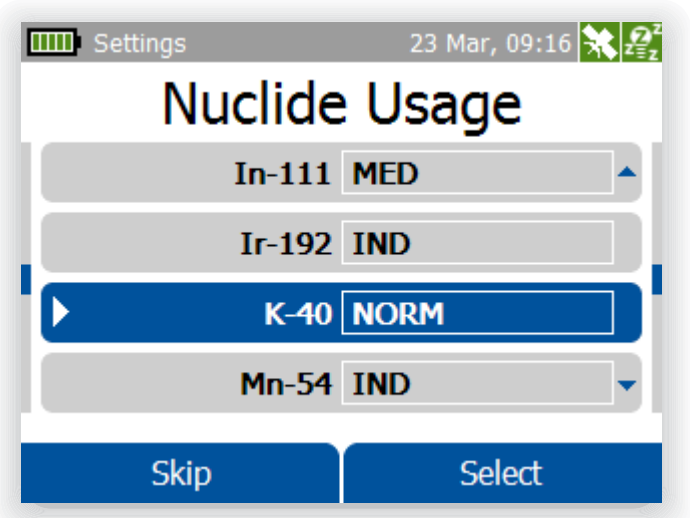

Figure 125. Usage information in the nuclide list used by the identification algorithm

Down, Up, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.7 Nuclide Severity

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Identification Options (p. 103) ➤ Nuclide Severity

Settings (p. 180) ➤ Nuclides (p. 193)

Built into the FLIR identiFINDER R300 is a library used to identify the nuclides causing gamma radiation. Please refer to Appendix C, p. 259 for further information about the nuclides in this library.

Every nuclide has associated information about its potential danger which you can have shown in identification results (Figure 96, p. 93). You can adapt the severity for the nuclides in the library according to your needs with this command (Figure 126, p. 121).

⚠ The severity of some nuclides is fixed. This is indicated by a small padlock symbol.

Settings and Commands

Nuclides...

Choose one from the list of nuclides to edit the associated severity.

I Innocent

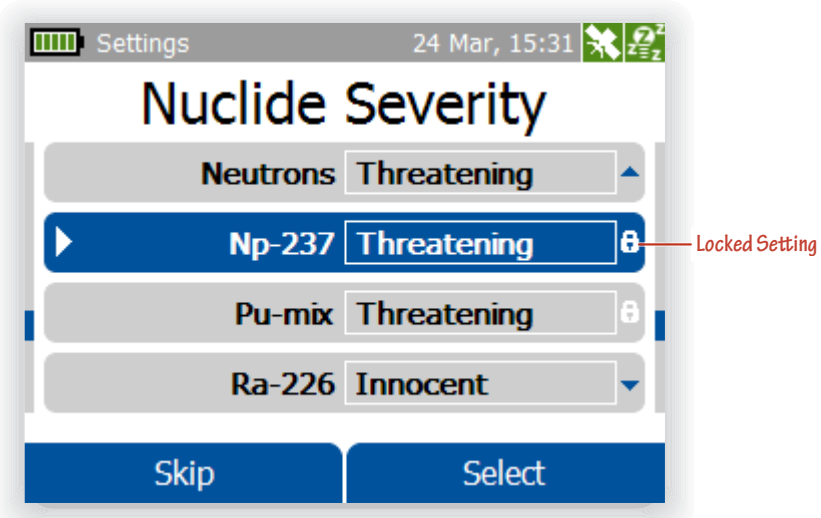

Figure 126. Severity information in the nuclide list used by the identification algorithm

S Suspicious

T Threatening

Skip

Cycle the list of commands (see 2.2.1, p. 35).

Down, Up, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.8 Presets

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Presets

This screen (Figure 127, p. 122) groups options that influence the data acquisition for spectra (6.2, p. 106).

You can stop the data acquisition for spectra manually or have it stop automatically after a duration or a number of counts you specify here.

⚠ You can preset either one of these limits. If you try to enter a second preset, the others will be set to “No Limit”.

Preset limits remain in effect until you change them or switch off your FLIR identiFINDER R300.

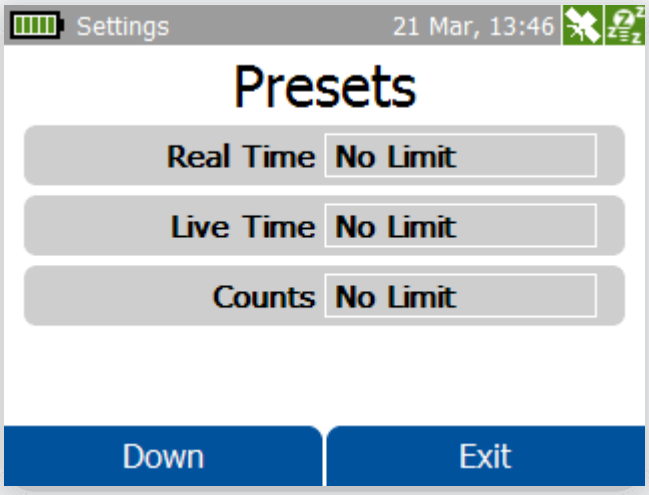

Figure 127. Preset times for spectrum data acquisition

Settings and Commands

Real Time

Specify the duration of data acquisition as real time. You can specify durations up to 43200 s (12 h) or “No Limit”.

Live Time

Specify the duration of data acquisition as live time. You can specify durations up to 43200 s (12 h) or “No Limit”.

Counts

Specify the number of counts to be acquired. You can specify values from 100 to 9 999 900 in steps of 100 or “No Limit”.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.9 Display Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ General Options (p. 104) ➤ Display Settings

Settings (p. 180) ➤ General (p. 184) ➤ User Interface (p. 186)

This screen groups several options that influence the display of your FLIR identiFINDER R300 (Figure 128, p. 123).

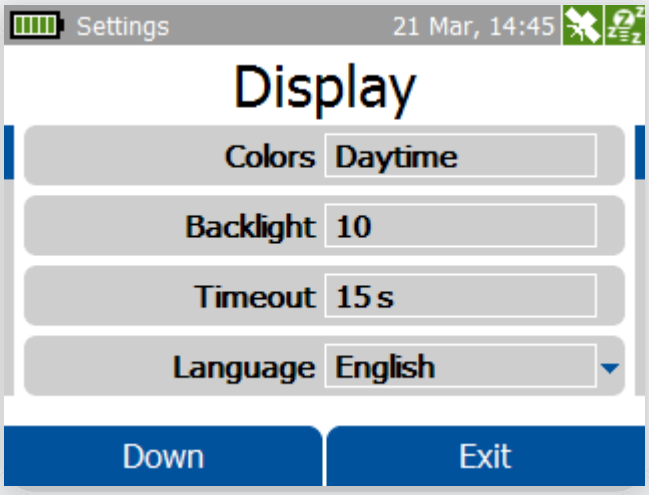

Figure 128. Display settings in daytime colors

Settings and Commands

Colors

Choose a color set for the display.

Daytime

Colors optimized for bright environments (Figure 128, p. 123). Almost all screen shots in this manual were taken using this color set.

Nighttime

Colors optimized for dazzle-free reading in dark environments (Figure 129, p. 123).

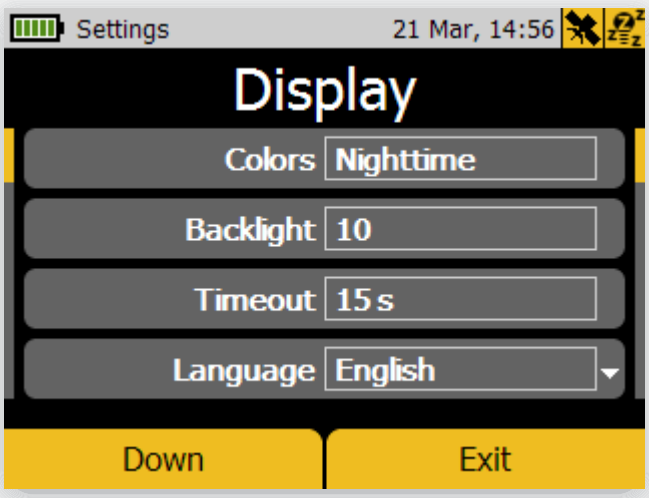

Figure 129. Display settings in nighttime colors

Classic

Colors mimicking the monochrome appearance of outdated instruments (Figure 130, p. 124).

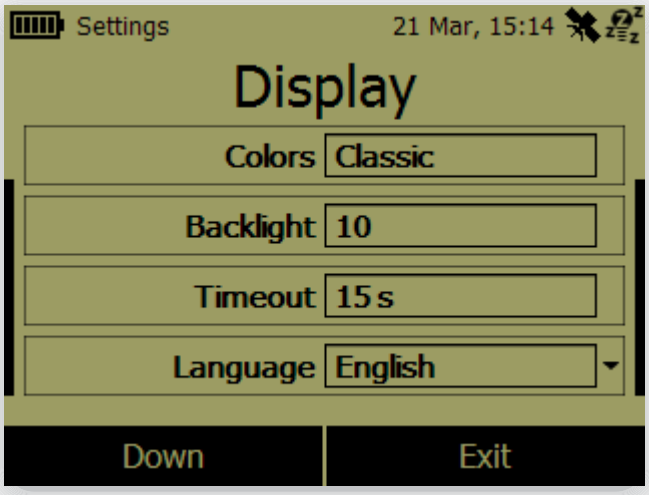

Figure 130. Display settings in classic colors

Backlight

Specify the brightness of the display's backlight in steps between 1 (dim) and 10 (very bright).

Timeout

Specify the duration of user inactivity after which the display backlight is dimmed to save energy. You can choose from 15 s – 60 s – 5 min – Never.

The backlight draws a significant amount of power, you should let it time out while running on batteries.

After the backlight times out, you can reactivate it by briefly pressing any key. At this moment, the usual functions of short key presses are ignored.

Language

Choose a language to be used for the display.

English

English with American spelling

Deutsch

German

... *more languages...*

Ensure you understand enough of the language you are changing to. It may be difficult to change back if you do not understand the menu language.

Key Functions

Choose a mapping of commands to keys to accommodate your personal preferences (Figures 10–11, p. 33–34).

The actual function of the keys is always displayed on-screen.

Normal

Commands are mapped to the L and R keys as shown in this manual.

Swapped

Commands mapped to the L and R keys are exchanged.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.10 Clock Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ General Options (p. 104) ➤ Clock Settings

Settings (p. 180) ➤ GPS and Clock (p. 186) ➤ Clock (p. 187)

You can check and change the settings of the FLIR identiFINDER R300's clock in this screen (Figure 131, p. 125).

If the GPS receiver is switched on (see 6.11, p. 127), the received time sets the clock of the FLIR identiFINDER R300 and the only setting you have to specify is your time zone.

If the clock setting seems unreasonable when switching on the FLIR identiFINDER R300 (see 2.5, p. 62), for example after the batteries were completely empty for a while, this screen will show up and you will be asked to enter the correct date, time, and time zone settings.

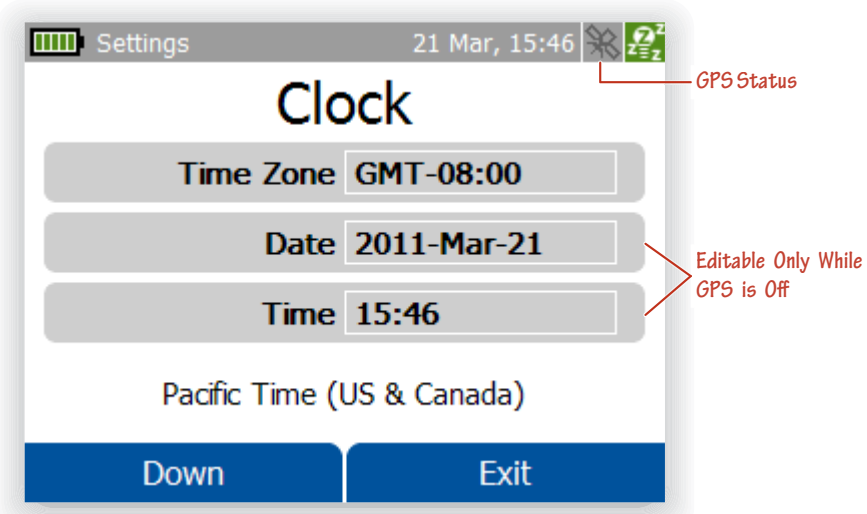

Figure 131. Setting date and time while GPS clock is not available.

⚠ If GPS date and time information become available while you edit the date or time, editing will be cancelled and the GPS clock is used.

Settings and Commands

Time Zone

Select your time zone from the list built into the FLIR identiFINDER R300. Time zones are specified as offset from UTC/GMT (Figures 132–133, p. 126–126).

Periods for daylight savings time, however, might be different for the same offset from UTC in various regions. To have the FLIR identiFINDER R300 consider the correct daylight savings time for your time zone, make sure to check the region info when selecting the offset.

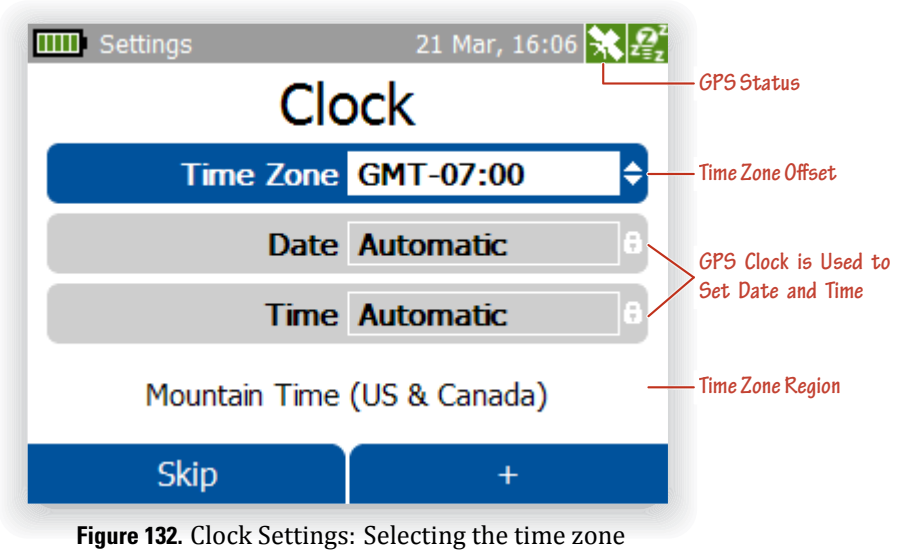

Figure 132. Clock Settings: Selecting the time zone

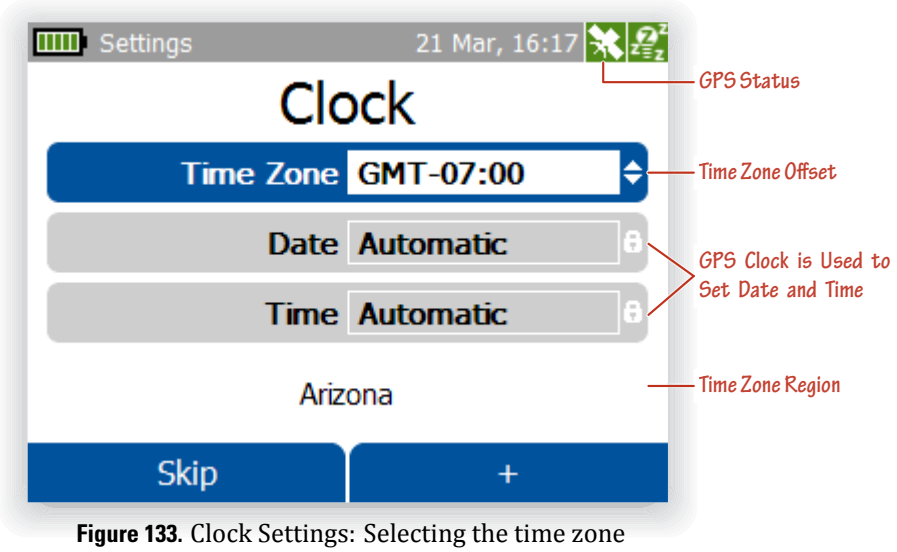

Figure 133. Clock Settings: Selecting the time zone

Date

Specify year, month and day of the current date.

Time

Specify hours and minutes of the current time.

The time is specified in 24-hour format (ISO 8601).

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Left, Right

Edit composite values, see 2.2.4, p. 40 for details.

Exit

Return to the superior menu.

6.11 GPS Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ General Options (p. 104) ➤ GPS Settings

Settings (p. 180) ➤ GPS and Clock (p. 186) ➤ GPS (p. 186)

This screen (Figure 134, p. 127) groups settings regarding the FLIR identiFINDER R300's GPS receiver.

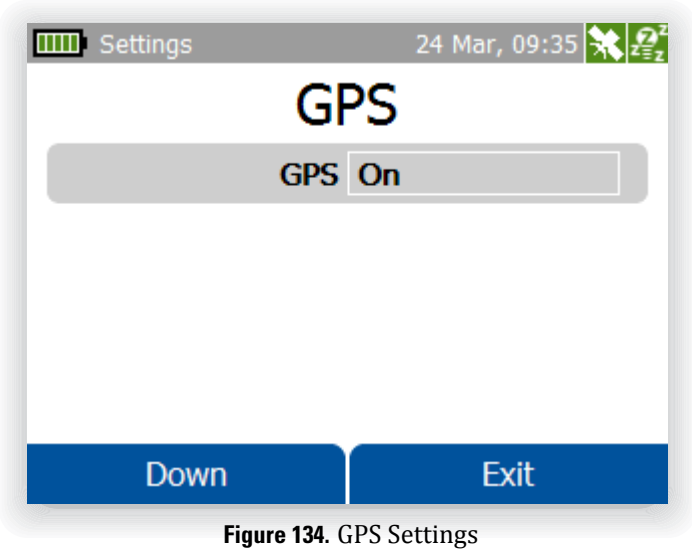

Figure 134. GPS Settings

Settings and Commands

GPS

Switch the GPS receiver On or Off (factory default).

The GPS receiver draws a significant amount of power, you should switch it off if you don't need it, especially while running on batteries.

If the GPS receiver is on and the reception is good enough, the GPS coordinates of the current location are stored with alarms, spectra, identification results etc.

If the GPS reception is not good enough, for example inside buildings, the current location cannot be determined. If a location could be determined from GPS data since you switched on the FLIR identiFINDER R300, the last valid location is used. Otherwise, the position of the intersection of the Greenwich Meridian with the Equator is used (0° N, 0° E).

Additionally, the clock of the FLIR identiFINDER R300 is set according to the high-precision time received from the GPS satellites (see 6.10, p. 125).

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.12 Set Password

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Change Password (p. 104) ➤ Set Password

The password set at the factory, if any, is LMRLMRL. For better protection against unwanted changes of the instrument characteristics, you should change the password to something else. If you don't need protection but want faster access to the menus, you can remove the password (6.13, p. 129).

Make sure to remember the password you set. There is no way to access the protected options and commands without it. A password cannot be deciphered at the factory.

This command lets you enter a new password (Figure 135, p. 129) consisting of seven characters from the pool L M R.

To cancel the entry of the password press ⏻.

After your entry is complete (Figure 136, p. 129), you can activate the password with Change or Cancel the password modification.

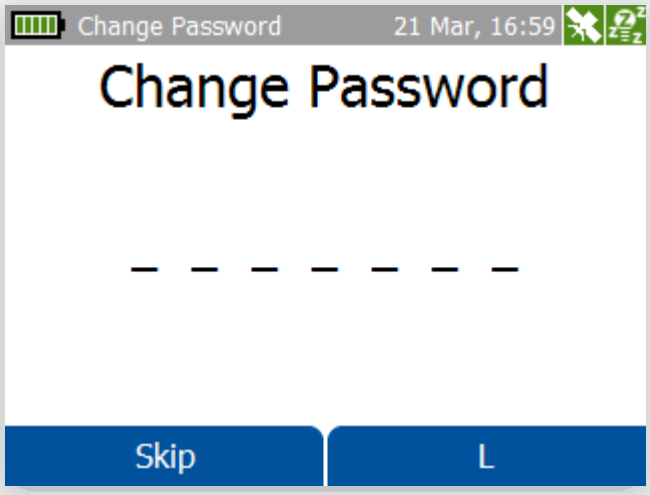

Figure 135. Entering a new password

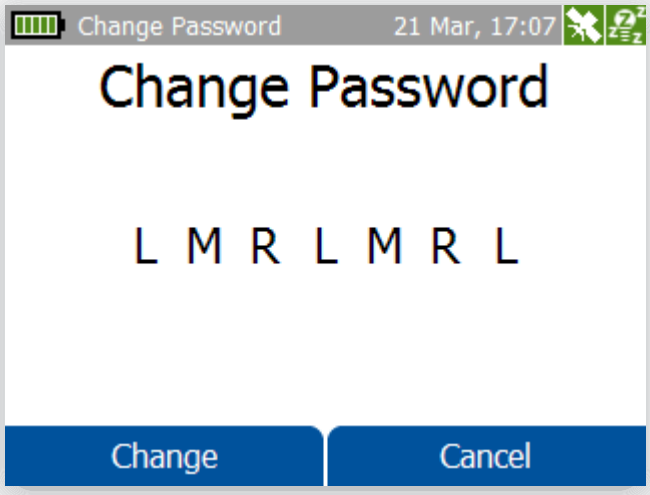

Figure 136. Entering a new password: Confirmation

6.13 Clear Password

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Change Password (p. 104) ➤ Clear Password

This command clears the password. All commands normally requiring a password to be accessed will be freely available.

You have to confirm this command with Clear or can change your mind with Cancel (Figure 137, p. 130).

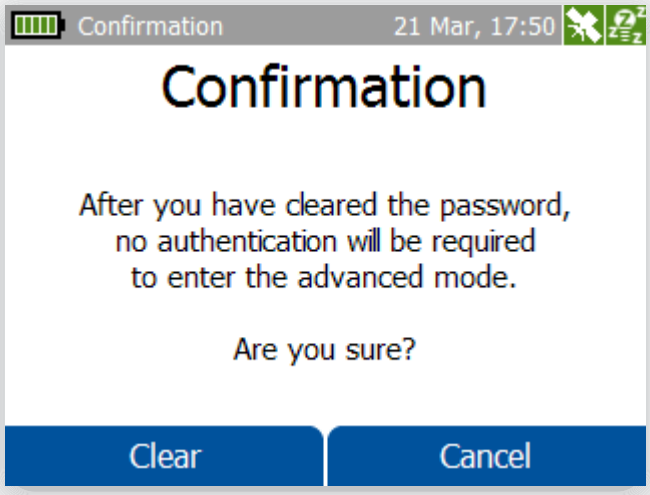

Figure 137. Removing the password

6.14 Show Status

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Show Status

Home (p. 179) ➤ Info (p. 181) ➤ System (p. 181)

Settings (p. 180) ➤ GPS and Clock (p. 186) ➤ GPS (p. 186)

This command displays various status and version information for your FLIR identiFINDER R300 on several pages (Figures 138–139, p. 131–131).

Settings and Commands

System ⇋ GPS

Step through the status pages.

System

Various information about your FLIR identiFINDER R300 (Figure 138, p. 131).

Serial Number

The serial number of your FLIR identiFINDER R300.

Available Memory

The capacity remaining to store spectra, alarms, screenshots, etc.

You can free memory by erasing all or some of the data (see 6.16, p. 133) if necessary.

Screenshots

The number of screen shots saved in memory.

IP Address

The IP address of your FLIR identiFINDER R300. You need this address to communicate with the instrument from a computer (see 6.26, p. 152).

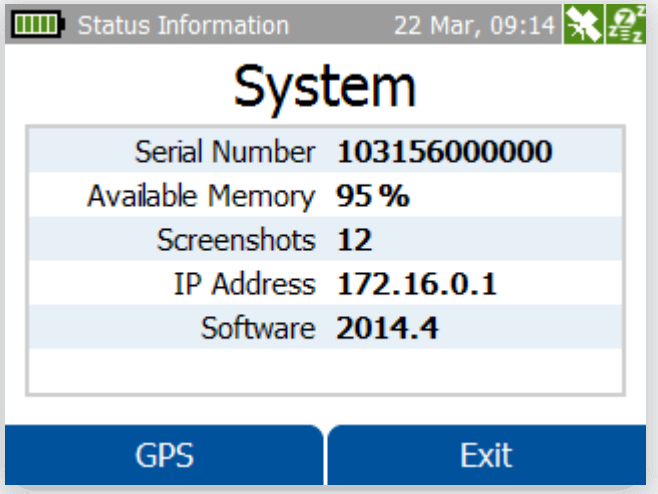

Figure 138. FLIR identiFINDER R300 status display: System

Software

The version of the software.

GPS Your current location determined from the GPS data received by the FLIR identiFINDER R300 (Figure 139, p. 131).

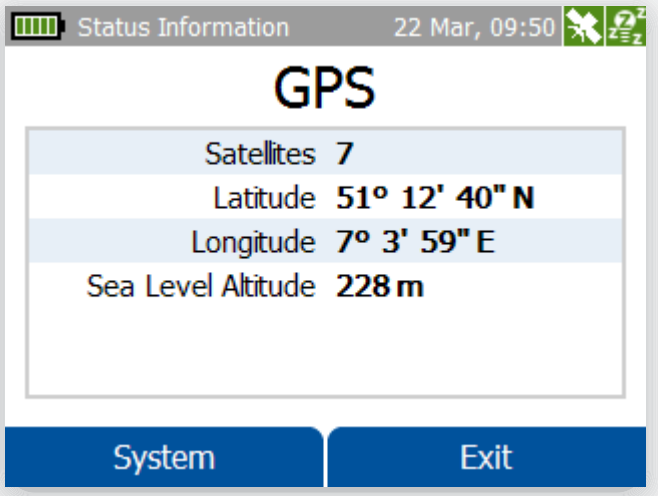

Figure 139. FLIR identiFINDER R300 status display: GPS

The GPS status data are shown only if the GPS receiver is switched on (see 6.11, p. 127).

Satellites

The number of satellites currently "visible" to the FLIR identiFINDER R300. The more satellites, the better the precision of the location data.

If this number drops below 3, the given location is invalid. It is either the most recent valid location, or, if there was no valid location since you switched on the FLIR identiFINDER R300, the intersection of the Greenwich meridian and the equator.

Latitude

The current location north or south of the equator given in angle degrees, minutes and seconds.

Longitude

The current location west or east of the prime meridian passing through the Royal Observatory in Greenwich (UK) given in angle degrees, minutes and seconds.

Altitude

The current altitude in meters above or below the mean sea level as defined by the WGS84 geoid used by GPS.

Exit

Return to the superior menu.

6.15 Reset Factory Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Reset Factory Settings

This command (Figure 140, p. 132) discards all changes you made to any of the FLIR identiFINDER R300's settings and reestablishes the settings made at the factory.

⚠ The password (see 2.2.7, p. 46), if any, is reset to the factory setting as well.

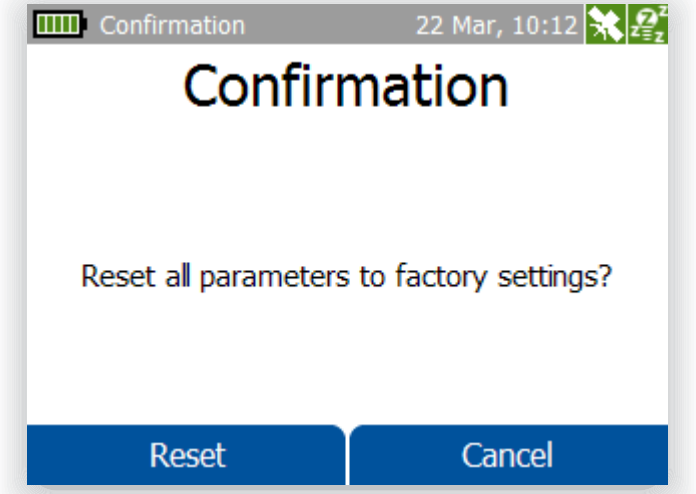

Figure 140. Reestablishing the factory default settings

Settings and Commands

Reset

Discard all your personal settings and return to the factory default settings.

Cancel

Keep the current settings and return to the superior menu.

6.16 Erase All Spectra

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Erase Data (p. 104) ➤ Erase All Spectra

This command (Figure 141, p. 133) deletes all spectra saved in the FLIR identiFINDER R300's database, including min/max/average for dose rate and neutron, GPS location, and identification, if any.

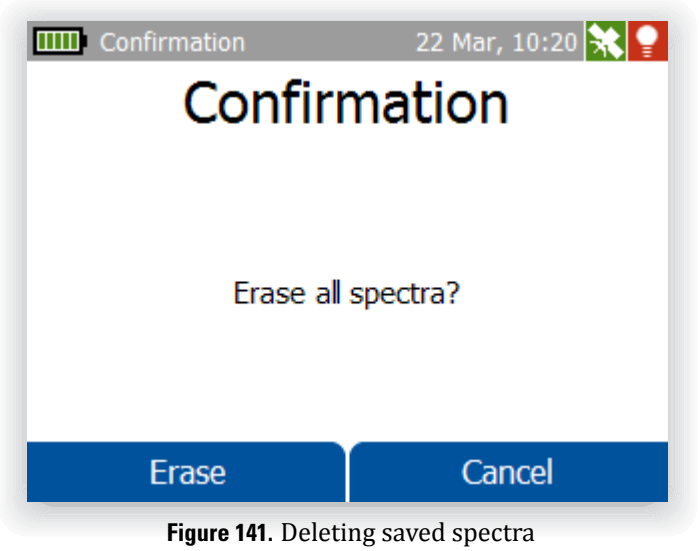

Figure 141. Deleting saved spectra

Settings and Commands

Erase

Delete all saved spectra.

Cancel

Keep the saved spectra and return to the superior menu.

6.17 Erase All Alarms

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Erase Data (p. 104) ➤ Erase All Alarms

This command (compare Figure 141, p. 133) deletes all alarms saved in the FLIR identiFINDER R300's permanent memory.

Settings and Commands

Erase

Delete all saved alarms.

Cancel

Keep the saved alarms and return to the superior menu.

6.18 Erase All Screenshots

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Erase Data (p. 104) ➤ Erase All Screenshots

This command (compare Figure 141, p. 133) deletes all screenshots saved in the FLIR identiFINDER R300's permanent memory.

Settings and Commands

Erase

Delete all screenshots.

Cancel

Keep the screenshots and return to the superior menu.

6.19 Self Test

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Self Test

This command tests the display screen and activates all the alarm annunciators to demonstrate their proper operation.

Settings and Commands

Start

Start the test. The display should show several test patterns in the main colors red, green and blue.

Further tests regard the alarm LEDs, the vibrator, and the beeper. Follow the list of tests displayed (Figure 143, p. 135) and verify that the annunciators are working.

Exit

Return to the superior menu.

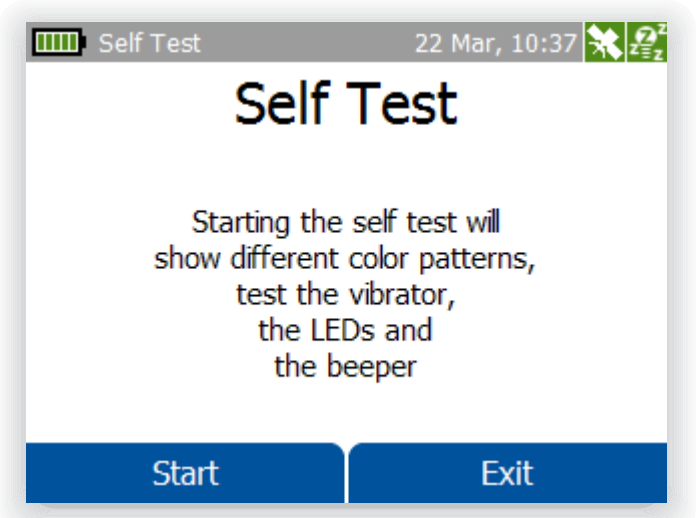

Figure 142. Starting a self test of the FLIR identiFINDER R300.

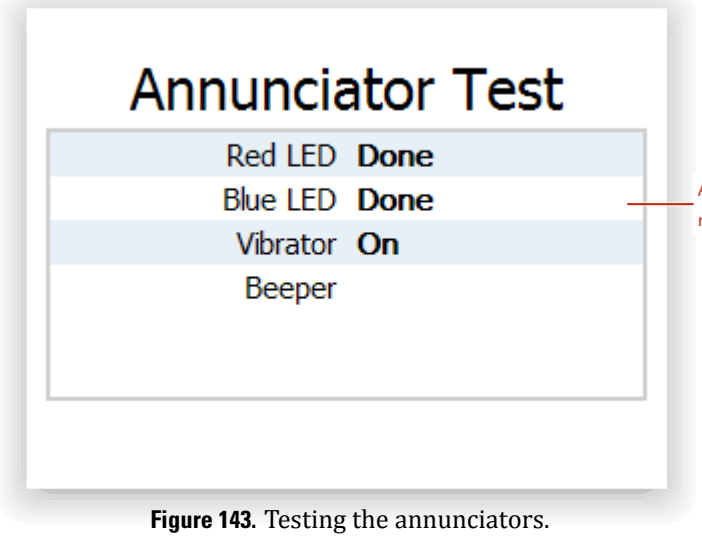

Figure 143. Testing the annunciators.

6.20 Automated Mode Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Data Logging (p. 104) ➤ Automated Mode Settings

Settings (p. 180) ➤ General (p. 184) ➤ Measurement (p. 184)

This screen (Figure 144, p. 136) groups settings regarding the FLIR identiFINDER R300's automated identification mode (see 4.4, p. 93).

Settings and Commands

Time Interval

Choose one of the available intervals for automated identification measurements:

Off, 10 min, 15 min, 30 min, 60 min, On Dose Rate Warning.

The scheduled times will be rounded relative to the full hour.

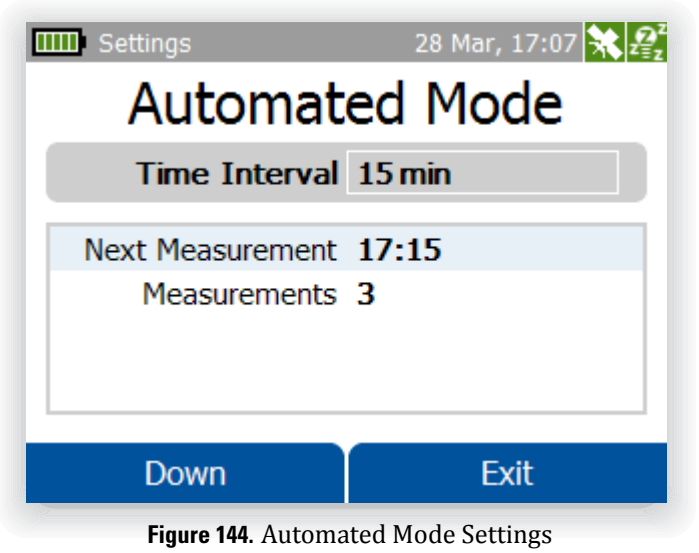

Figure 144. Automated Mode Settings

Automated identification on dose rate warning

This feature can be helpful when used in controlled circumstances such as monitoring pedestrian flow through a controlled choke point where the operator can manage the "flow" and hold the line until the identification measurement is complete. This allows for hands-free operation and a simplified path to the required result.

Use of this feature in uncontrolled situations, however, can generate very confusing and disorienting information.

Consider, for example, trying to use this feature while in the middle of a crowd with people moving in multiple directions. The instrument may register a passing warning and initiate an identification measurement on a target that continues to move away. This target could continue to move away in any direction so as to place the operator in a dilemma – what to do? It is highly likely that the instrument will fail to complete the identification process so concluding with an inconclusive and useless result.

It is highly recommended that this mode **ONLY** be used when the situation is controlled and manageable.

The success of the instrument or operator unit can be adversely affected if this advice is not followed though there is no fault of either the instrument or the operator.

FLIR Detection, Inc. also wishes to avoid the performance of the instrument being called into question through no fault of the instrument.

Next Measurement

The scheduled time of the next measurement.

Measurements

The number of measurements recorded since activating automated measurements.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.21 Send Identification

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Send Data (p. 104) ➤ Send Identification

This command initiates a multi-step procedure to send a record of identification results stored in the FLIR identiFINDER R300's database to a remote server (see 9, p. 219).

The procedure to send identification results is the same as that for sending spectra. The only difference is in the contents of the file sent. This description applies to both this and the Send Spectrum command (see 6.22, p. 140).

You can choose from the identification results available in the database (Figure 145, p. 137). The date and time of saving the identification is displayed while you step through the available data.

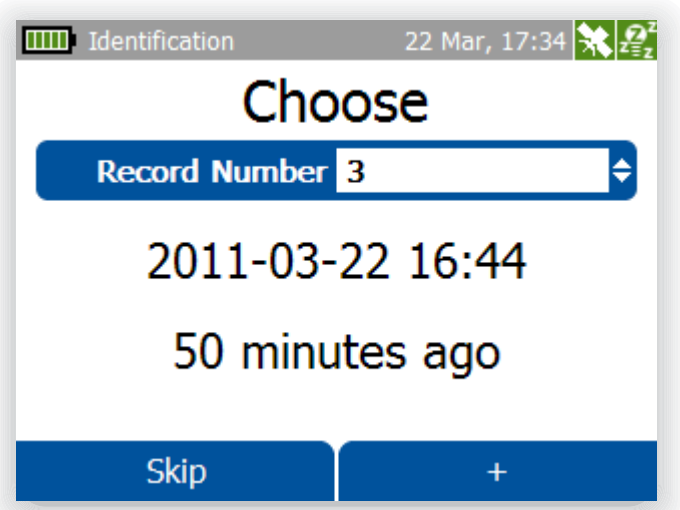

Figure 145. Sending Data: Choosing a record of identification results

If you entered this command from the Identification Mode (see 4.3, p. 90) or the spectrum display (see 6.2, p. 106), the correct record is already chosen.

A summary of the chosen identification is shown (Figure 146, p. 138) so you can verify your choice and choose other data if necessary.

The spectrum analyzed to compute the identification results is always included with the sent data.

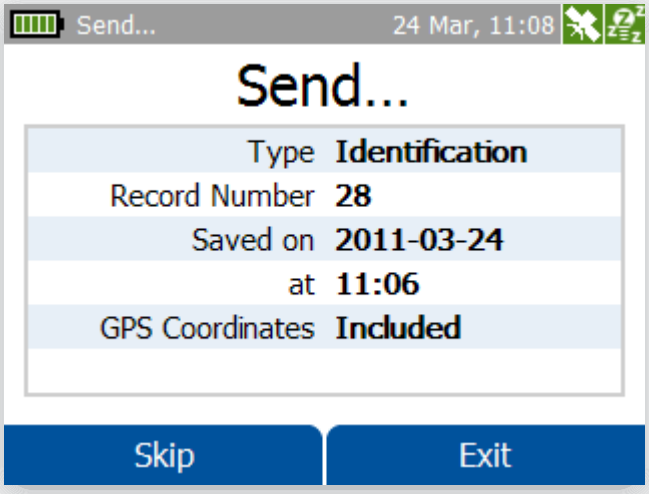

Figure 146. Sending Data: Identification summary

Settings and Commands

Choose

Choose another record for sending (Figure 145, p. 137).

Send

Start sending the chosen data.

Several settings (see 9, p. 219) are required to send data. If any one of these settings is missing, you will be notified (Figure 147, p. 139) and routed to the appropriate screen to enter the missing setting.

We recommend specifying the required settings before sending data (see 6.24, p. 149 and 6.27, p. 153). The most convenient way to do so is via the web interface (see 8.6.1, p. 190).

During the transfer of data you will be kept posted about the progress of the transmission steps (Figure 148, p. 139).

After all data are successfully transferred, you will be notified (Figure 149, p. 140) and can acknowledge the message with OK.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

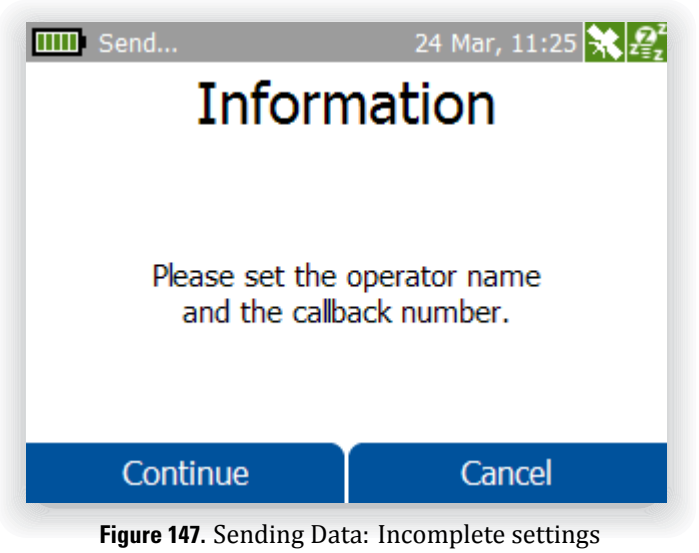

Figure 147. Sending Data: Incomplete settings

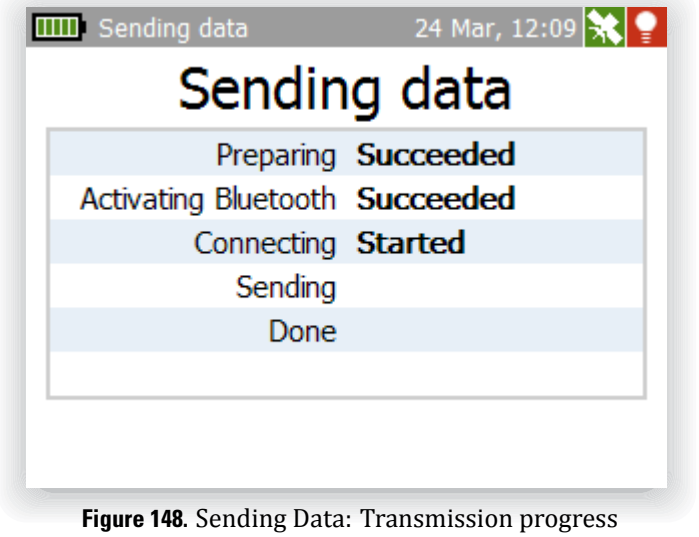

Figure 148. Sending Data: Transmission progress

Exit

Return to the superior menu.

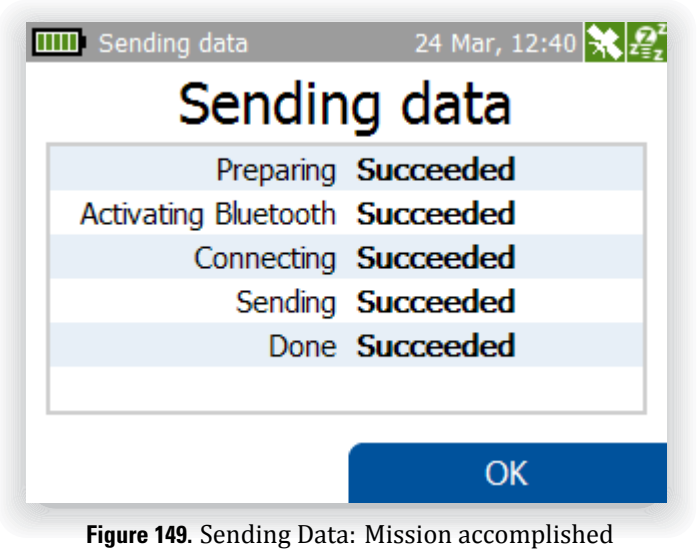

Figure 149. Sending Data: Mission accomplished

6.22 Send Spectrum

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Send Data (p. 104) ➤ Send Spectrum

This command initiates a multi-step procedure to send a spectrum stored in the FLIR identiFINDER R300's database to a remote server (see 9, p. 219).

The procedure is the same as that for sending identification results. The description of the procedure is not repeated here, please refer to section 6.21, p. 137.

The only difference is in the contents of the file sent. You can choose from the results available in the database (Figure 150, p. 141). The date and time of saving the result is displayed while you step through the available records.

If you entered this command from the spectrum display (see 6.2, p. 106), the correct spectrum is already chosen.

A summary of the chosen record is shown (Figure 151, p. 141) so you can verify your choice and choose another one if necessary.

Please refer to section 6.21, p. 137 for a description of the remaining steps to send data to a remote server.

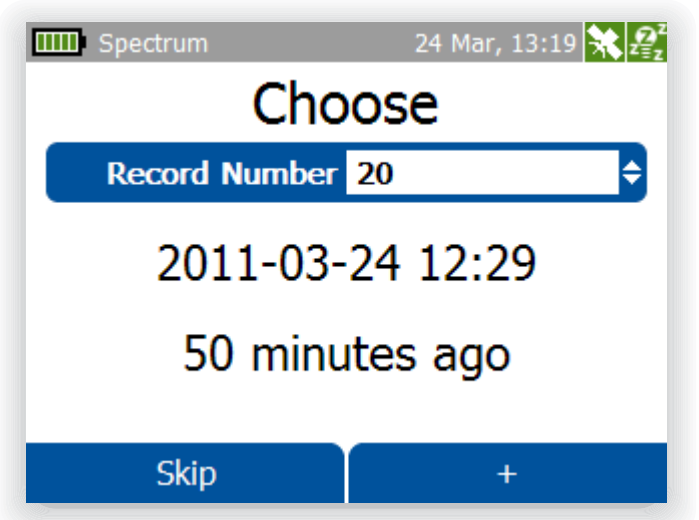

Figure 150. Sending Data: Choosing a spectrum

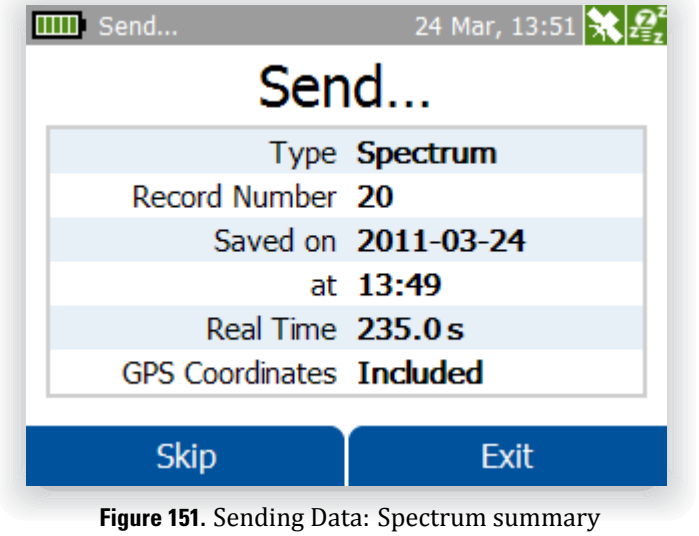

Figure 151. Sending Data: Spectrum summary

6.23 Bluetooth

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

The FLIR identiFINDER R300 supports two Bluetooth modes: Bluetooth Serial Port Protocol (SPP) and Bluetooth Periphery. While Bluetooth SPP Mode is enabled, Bluetooth Periphery Mode is disabled. Bluetooth SPP Mode supports a command set (see A.6, p. 245) for system integrators to develop custom remote interfaces. These two modes are described in the following sections.

6.23.1 Bluetooth SPP Status

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Bluetooth SPP (p. 104) ➤ Bluetooth SPP Status

This screen (Figure 152, p. 142) shows if the Bluetooth SPP mode is enabled and whether the FLIR identiFINDER R300 is currently Discoverable.

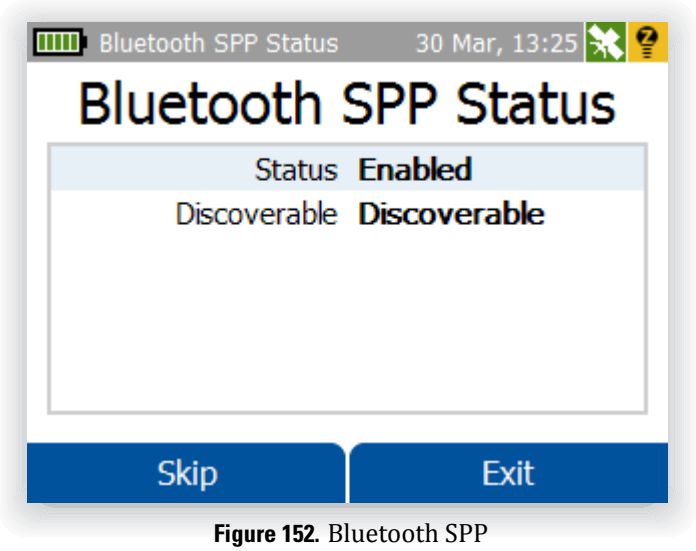

Figure 152. Bluetooth SPP

Settings and Commands

Status

Indicates whether **Enable SPP** (see 6.23.2, p. 142) is set to On (Enabled) or Off (Disabled) .

Discoverable

Indicates if the FLIR identiFINDER R300 is currently discoverable or not discoverable via Bluetooth in SPP Mode.

Settings

View and change the Bluetooth SPP Mode settings.

Exit

Return to the superior menu.

6.23.2 Bluetooth SPP Settings

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Bluetooth SPP (p. 104) ➤ Bluetooth SPP Status (p. 141) ➤ Bluetooth SPP Settings

Settings (p. 180) ➤ Bluetooth SPP Settings (p. 192) ➤ Bluetooth SPP Settings (p. 192)

This screen (Figure 153, p. 143) allows you to configure the FLIR identiFINDER R300 Bluetooth Serial Port Protocol mode.

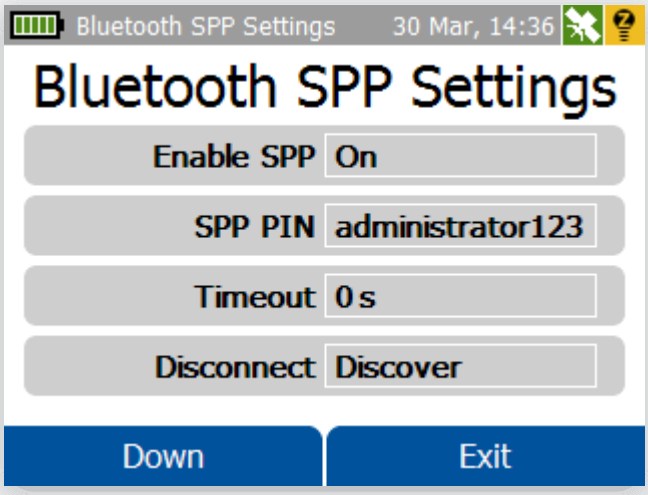

Figure 153. Bluetooth SPP

Settings and Commands

Enable SPP

When set to On the FLIR identiFINDER R300 will attempt to connect in SPP mode using the Bluetooth SPP settings. If set to Off, then Bluetooth Periphery mode can be enabled (see 6.23.3, p. 144).

Timeout

Specify the maximum elapsed time during which the FLIR identiFINDER R300 will be discoverable after discovery is initiated. You can specify values from 0 s to 100000 s. A value of 0 s will disable discovery timeout.

Disconnect

This specifies how the FLIR identiFINDER R300 should configure the Bluetooth SPP Mode after a Bluetooth connection is lost.

Discover

If a Bluetooth SPP connection is lost, the FLIR identiFINDER R300 will enable Discovery for the specified timeout period.

Off If a Bluetooth SPP connection is lost, the FLIR identiFINDER R300 will disable Bluetooth.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.23.3 Bluetooth Periphery

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Bluetooth Periphery

This command (Figure 154, p. 144) shows the Bluetooth device your FLIR identiFINDER R300 is currently paired with, if any, and lets you search the vicinity for other suitable Bluetooth devices supporting dial-up networking (9, p. 219).

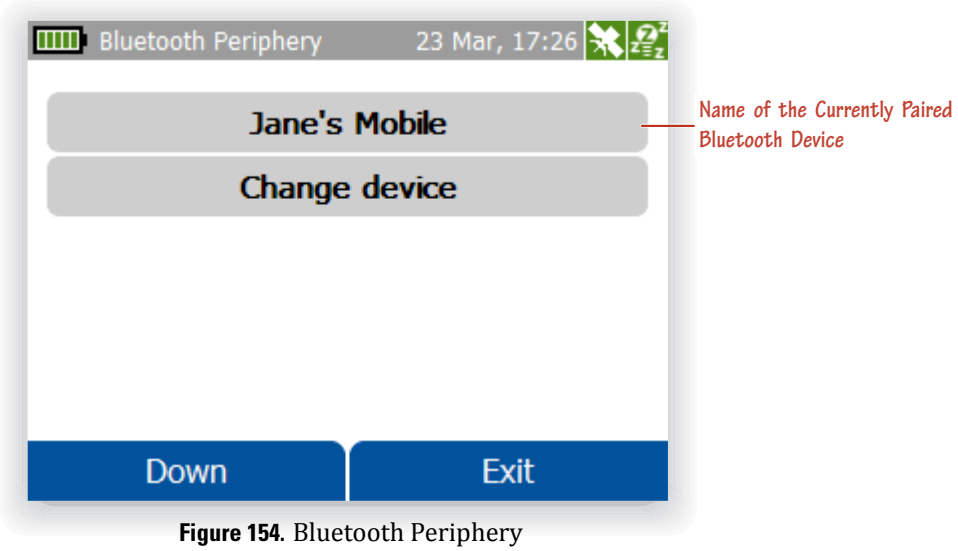

Figure 154. Bluetooth Periphery

If SPP Enabled is displayed, then you must first disable the Bluetooth SPP Mode (6.23.2, p. 142) before using Bluetooth Periphery Mode.

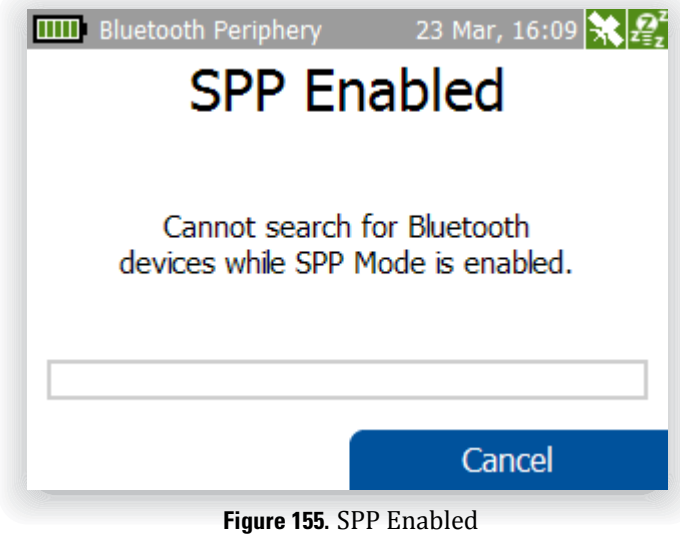

Figure 155. SPP Enabled

If your FLIR identiFINDER R300 is not currently paired with any Bluetooth device, the Change Device command (see below) is executed first.

Settings and Commands

Bluetooth Device Name

The name of the device the FLIR identiFINDER R300 is currently paired with. Selecting this item shows details about this device (Figure 162, p. 148).

Change Device

Guides you through the steps necessary to pair your FLIR identiFINDER R300 with a Bluetooth device.

➔ **To pair with a Bluetooth device**...

1. Prepare the Bluetooth device and make sure it can be found (perhaps called "discoverable" or "visible" in the device's settings).
2. Place the device in the vicinity of the FLIR identiFINDER R300 (up to ca. 10 m (33 ft)).
3. Initiate a search for devices with Start Search (Figure 156, p. 145).

Bluetooth Periphery
23 Mar, 15:08
Search
Prepare your Bluetooth devices to be found and press "Start search" to start a search sweep for them
Start search
Exit

Figure 156. Ready to search for Bluetooth devices

4. Wait a few moments while the FLIR identiFINDER R300 searches for Bluetooth devices supporting the required protocol (Figure 157, p. 146).
5. You can repeat the search if no device was found (Figure 158, p. 146) with Search.
6. Choose the desired Bluetooth device from the list shown (Figure 159, p. 147) with Down.

The device names are listed exactly as received from the detected devices. In case of ambiguous names, you should change the name of the Bluetooth device to something unique (refer to the manuals of your Bluetooth devices on how to achieve that).

If your desired device is not shown in the list, make sure its setup is correct, press Exit, select the command Bluetooth Periphery again and start another search.

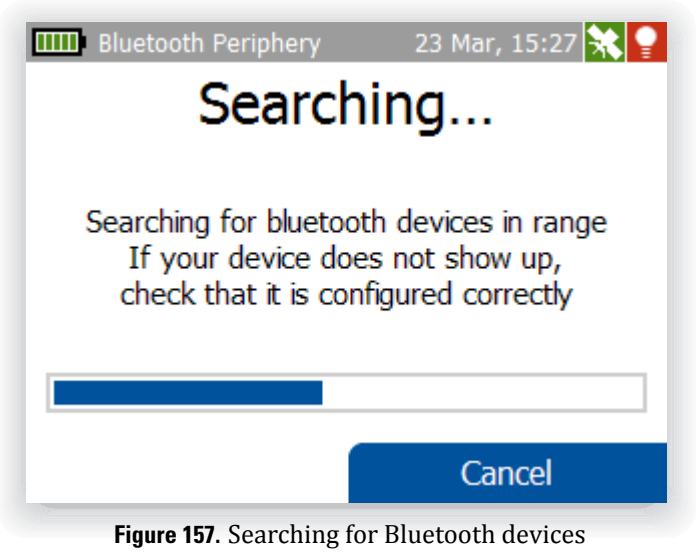

Figure 157. Searching for Bluetooth devices

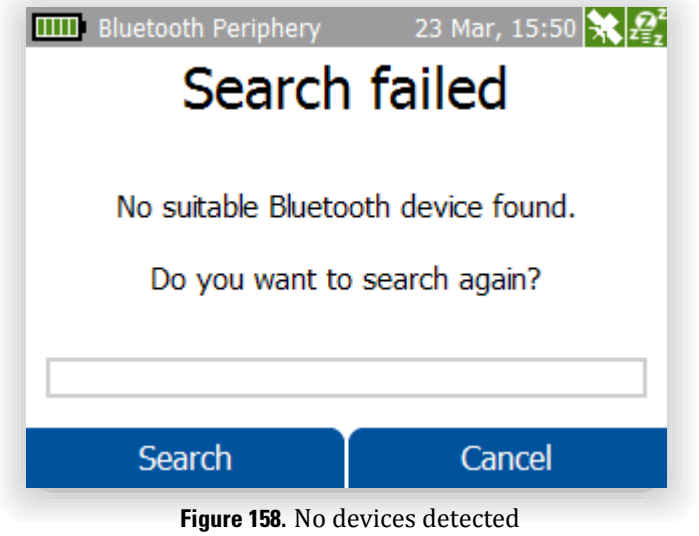

Figure 158. No devices detected

7. To start the pairing with the chosen device, press Select.
8. Choose the PIN type for a trusted connection (Figure 160, p. 147).
   Most devices require the entry of an ad hoc random PIN to establish a trusted connection. Other devices require the usage of a fixed PIN like 0000 or 1234.

   For questions refer to the manual that came with your Bluetooth device.

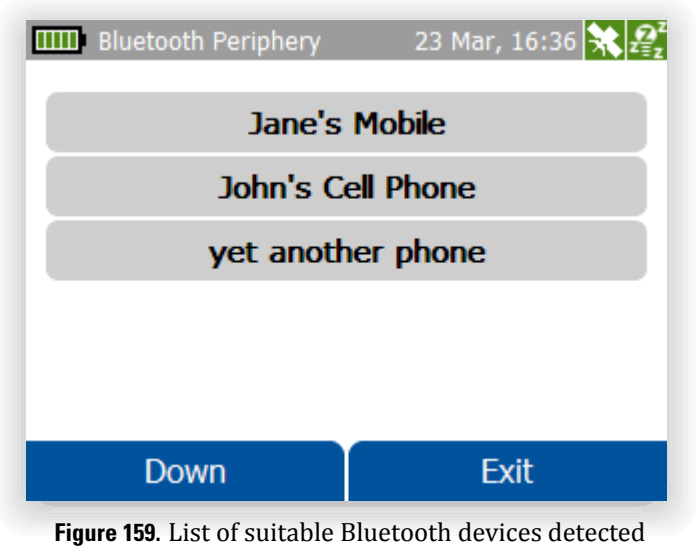

Figure 159. List of suitable Bluetooth devices detected

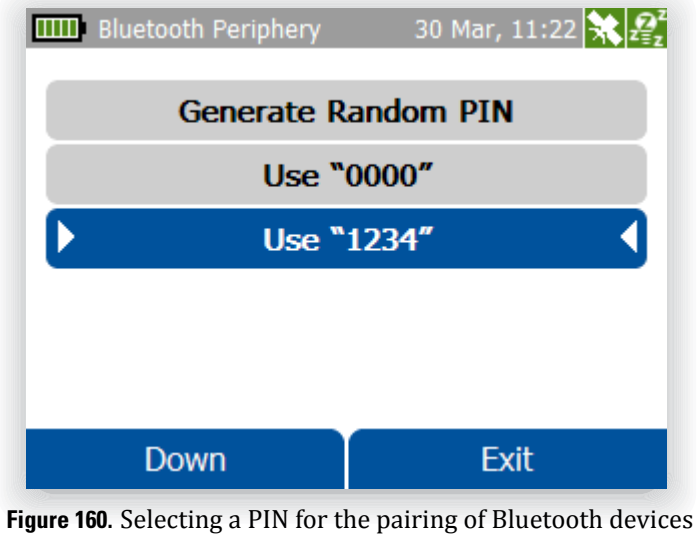

Figure 160. Selecting a PIN for the pairing of Bluetooth devices

9. If your device requires a PIN entry, use the PIN shown on your FLIR identiFINDER R300 screen (Figure 161, p. 148).

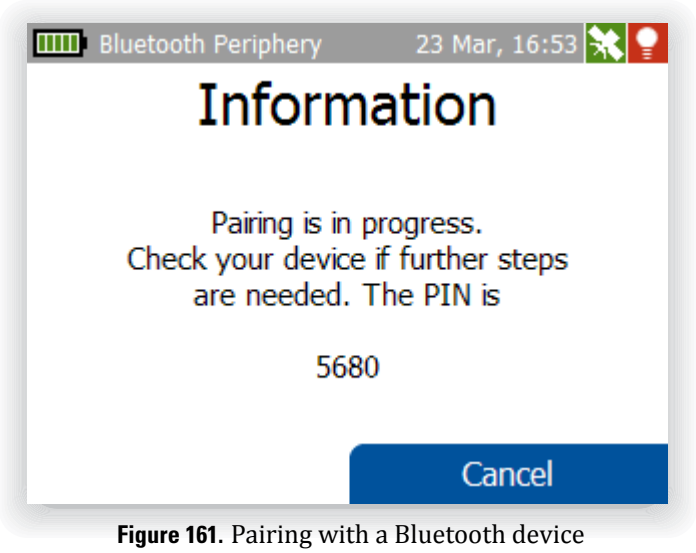

Figure 161. Pairing with a Bluetooth device

10. The FLIR identiFINDER R300 shows some information about the Bluetooth device after a successful pairing (Figure 162, p. 148).

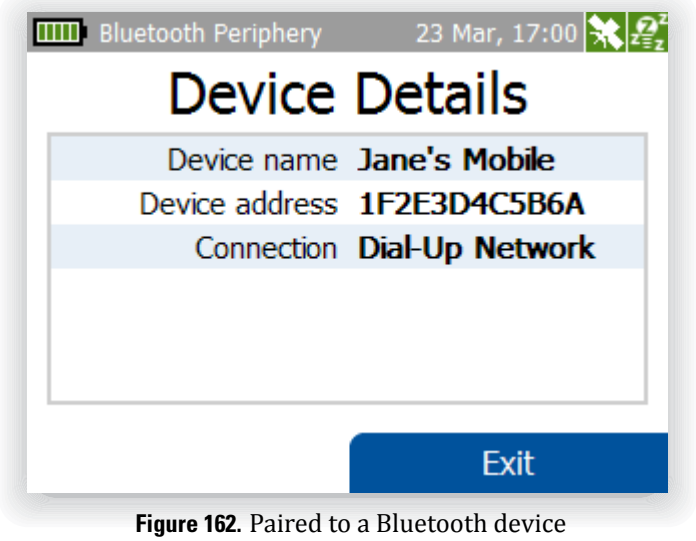

Figure 162. Paired to a Bluetooth device

⚠ An error message (Figure 163, p. 149) is displayed if pairing failed. Make sure the Bluetooth device is correctly configured, still in the vicinity, and try again.

Your FLIR identiFINDER R300 is now ready to communicate via the Bluetooth device.

Make sure not to move the Bluetooth device more than about 10 m (33 ft) away from the FLIR identiFINDER R300.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

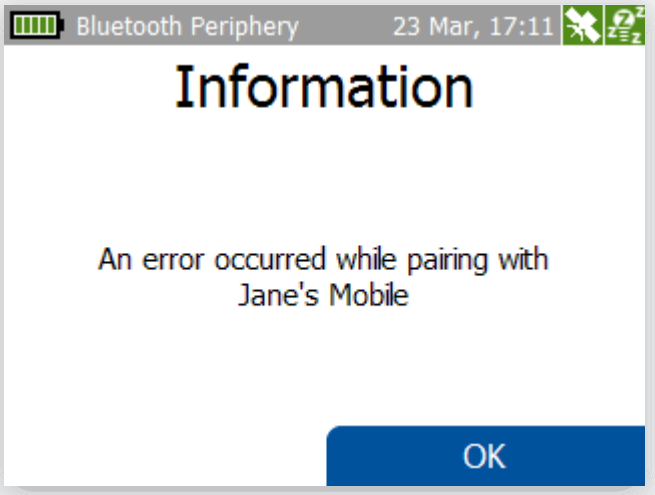

Figure 163. Pairing to a Bluetooth device failed

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.24 Remote Server Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Remote Server Settings

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Remote Server (p. 192)

This screen (Figure 164, p. 149) groups settings that influence the transfer of FLIR identiFINDER R300 data to a remote server. Refer to Chapter 9, p. 219 for details of this method.

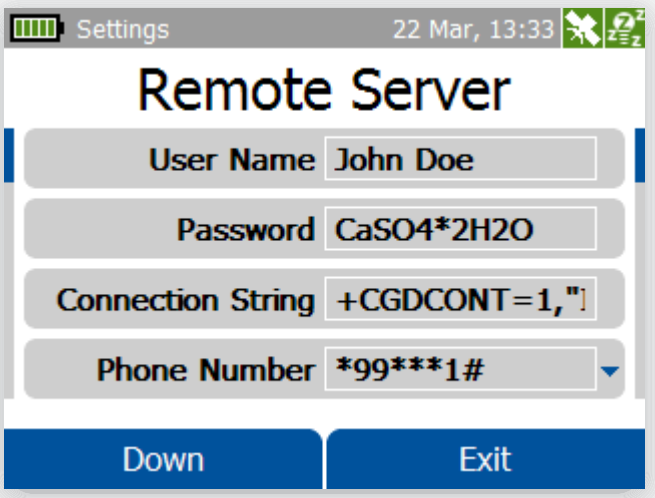

Figure 164. Upper items of the remote server settings

Settings and Commands

User Name

The user name and

Password

the password as provided by your cell phone carrier.

- This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Connection String

The connection info as provided by your cell phone carrier.

- This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Phone Number

The phone number to access a data connection as provided by your cell phone carrier or cell phone vendor.

- This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

HTTP URI

The address of the server receiving data from the FLIR identiFINDER R300 via Bluetooth or the web interface.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Left, Right, Insert, Delete

Edit composite and text values, see 2.2.4, p. 40 and 2.2.6, p. 43 for details.

Exit

Return to the superior menu.

6.25 Mass Storage

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Mass Storage

This command (Figure 165, p. 151) lets the FLIR identiFINDER R300 behave like a write-protected USB mass storage device similar to a hard disk or a USB stick. You can connect it to a local computer (7.2, p. 170) to copy files from the FLIR identiFINDER R300 to the computer.

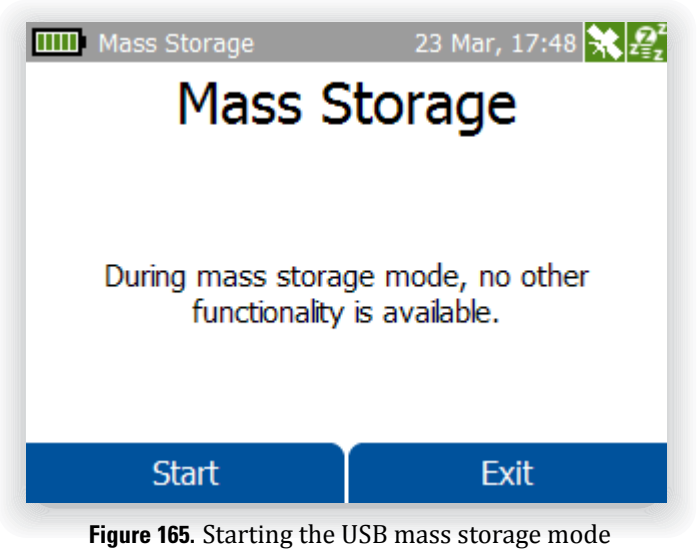

Figure 165. Starting the USB mass storage mode

Settings and Commands

Start

Start the USB mass storage mode (Figure 166, p. 151).

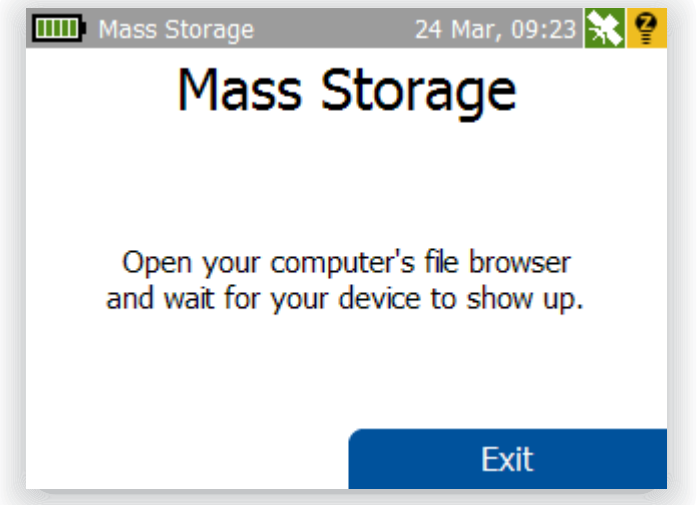

Figure 166. The FLIR identiFINDER R300 in USB mass storage mode

All of the FLIR identiFINDER R300 network services will stop and after a few moments the FLIR identiFINDER R300 will be recognized as an external hard disk by the connected computer. Use the file manager of your computer to inspect, for example, the drivers on the FLIR identiFINDER R300.

While the FLIR identiFINDER R300 acts as a hard drive, you cannot operate it. Routine jobs like monitoring the radiation for exceeding the alarm thresholds are not interrupted.

The FLIR identiFINDER R300 hard drive is write protected, that is, you cannot modify or add any data.

Exit

Return to the superior menu. The FLIR identiFINDER R300's network services will be reactivated.

6.26 Network

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Network

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Local Area Network (p. 190)

This screen (Figure 167, p. 152) groups settings related to the connections between your FLIR identiFINDER R300 and a computer.

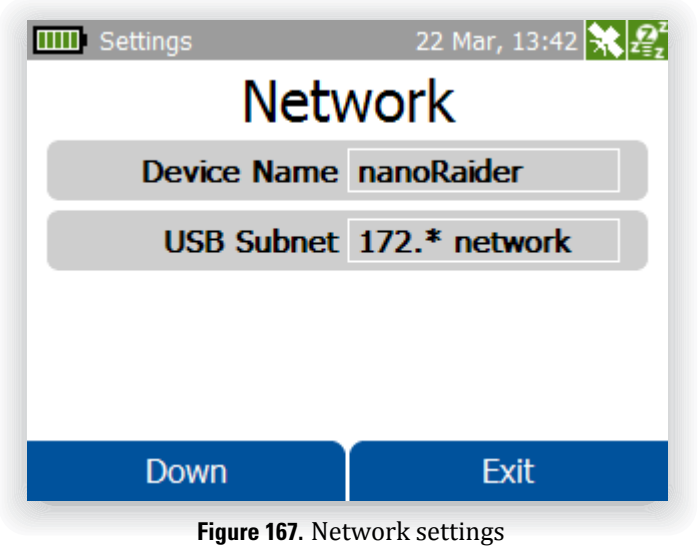

Figure 167. Network settings

It is recommended to restart your FLIR identiFINDER R300 after changing network settings. If the FLIR identiFINDER R300 is currently connected to an external device, you have to reestablish the connection according to the new settings.

Settings and Commands

Device Name

The name of this FLIR identiFINDER R300 to identify it in communication with other devices.

Spaces are not allowed in this text.

USB Subnet

To connect to the FLIR identiFINDER R300 via IP, it must have an IP address. This address is taken from one of the pools of IP addresses reserved by the IANA for private networks. You can choose from the listed pools.

Try to avoid subnets already in use in your local area network. Ask your network administrator when in doubt which pool best suits your network environment.

172.* Network

1 048 576 addresses from `172.16.0.0` to `172.31.255.255`

10.* Network

16 777 216 addresses from `10.0.0.0` to `10.255.255.255`

192.168.* Network

65 536 addresses from `192.168.0.0` to `192.168.255.255`

You can choose the subnet but not the IP address. The address is fixed and remains always the same for a given instrument.

The current IP address is shown on-screen whenever the FLIR identiFINDER R300 detects a connection to a network (Figure 199, p. 178).

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.27 Report Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Report Settings

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Reports (p. 192)

This screen (Figure 168, p. 154) groups settings specifying the content of reports you can download via the FLIR identiFINDER R300's web interface (8, p. 179) or send to remote servers (9, p. 219).

Settings and Commands

Operator Name

Your name and...

Voice Phone

your phone number for inclusion in reports.

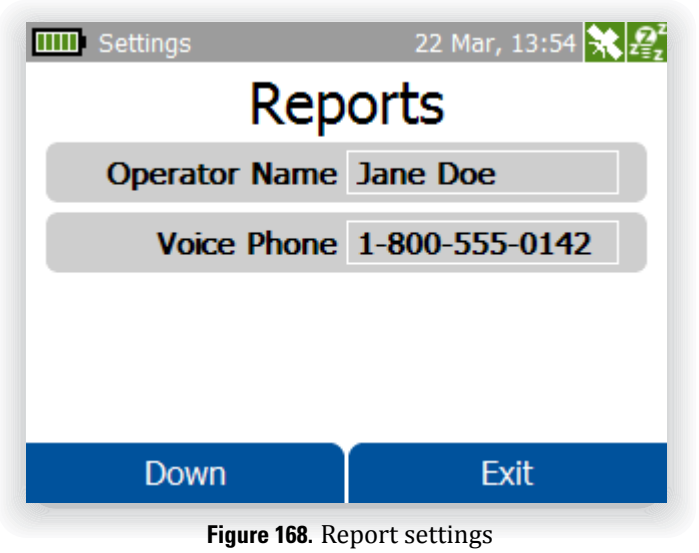

Figure 168. Report settings

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Left, Right, Insert, Delete

Edit composite and text values, see 2.2.4, p. 40 and 2.2.6, p. 43 for details.

Exit

Return to the superior menu.

6.28 Download Settings

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Download Settings

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Download Options (p. 192)

This screen (Figure 169, p. 155) lists several file formats available for transferring recorded data from the FLIR identiFINDER R300 to a connected computer (8, p. 179). You can accelerate the downloads by excluding file types not needed in your workflow. For example, the formats `*.n42`, `*.spc`, and `*.spe` usually contain the same information in different formats.

Some file formats are not available for all types of data.

Settings and Commands

.n42 (2012)

Files formatted according to the 2012 edition of the ANSI N42.42 Standard.

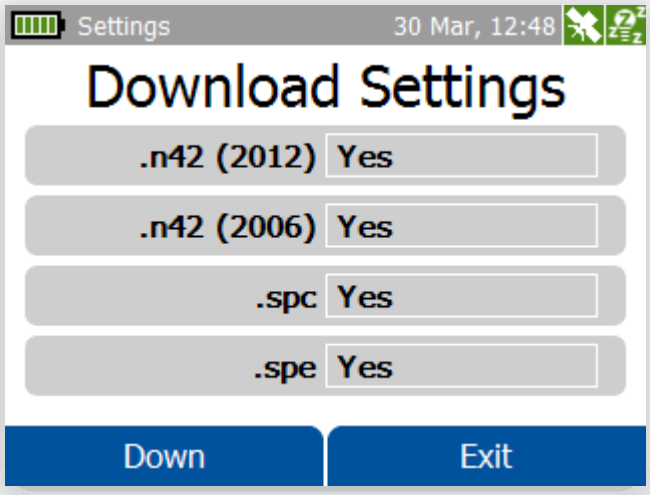

Figure 169. Download settings

.n42 (2006)

Files formatted according to the 2006 edition of the ANSI N42.42 Standard.

...

Other file formats.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.29 Gamma, Neutron Counters

Options Menu (p. 103) ➤ Gamma, Neutron Counters

This command displays the state of various counters (Figure 170, p. 156). If your variant is equipped with a neutron detector, its results will be shown as well (Figure 171, p. 156).

The counters for gamma and neutrons (if available) are reset when you switch on the FLIR identiFINDER R300 or when you reset them explicitly (see below).

The counter for dose keeps accumulating data until you explicitly reset it (see below).

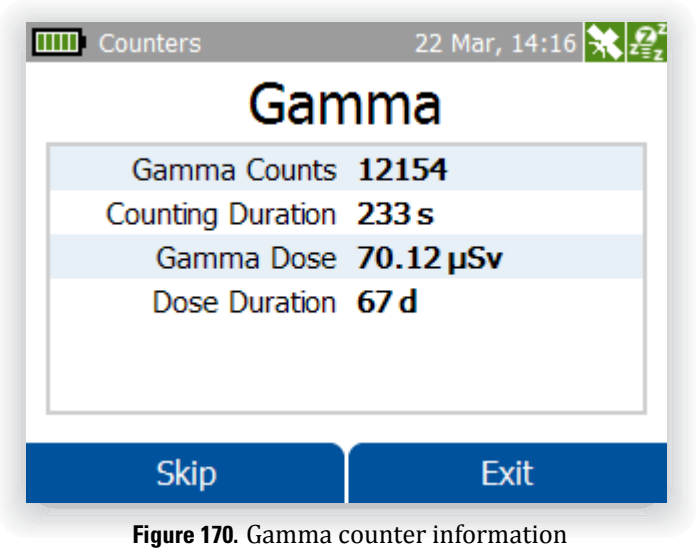

Figure 170. Gamma counter information

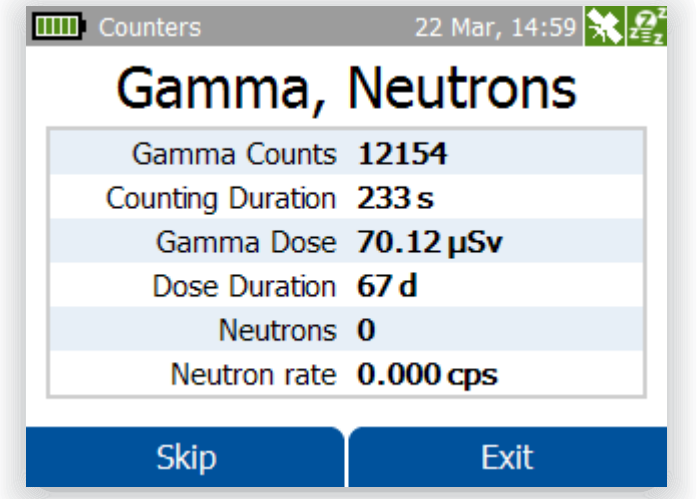

Figure 171. Gamma and neutron counter information (Available only for variants equipped with a neutron detector.)

Settings and Commands

Gamma Counts

The accumulated gamma counts registered by the detector crystals.

Counting Duration

The time frame, in seconds, in which the neutrons shown at the bottom and gamma counts shown above were measured.

Gamma Dose

The accumulated gamma dose. You can specify the unit used for display, see 6.31, p. 159.

Dose Duration

The time span, in seconds, in which the gamma dose shown above was measured.

Neutrons

The accumulated neutron counts.

♦ Available only for variants equipped with a neutron detector.

Neutron Rate

The current neutron rate in counts per second

♦ Available only for variants equipped with a neutron detector.

Reset Dose

Reset both the Gamma Dose and Dose Duration. Measuring is not interrupted, merely the accumulated values are set to zero.

Stop ⇋ Reset

Stop the accumulation of data for neutrons (if available) and gamma.

To reset the accumulators and timers for neutrons (if available) and gamma counts to zero and resume accumulating new data, press again.

Exit

Return to the superior menu.

6.30 Finder Settings

Options Menu (p. 103) ➤ Finder Settings

Settings (p. 180) ➤ General (p. 184) ➤ Measurement (p. 184)

This screen (Figure 172, p. 157) groups options that influence the FLIR identiFINDER R300's behavior in Finder mode (see 4.2, p. 88).

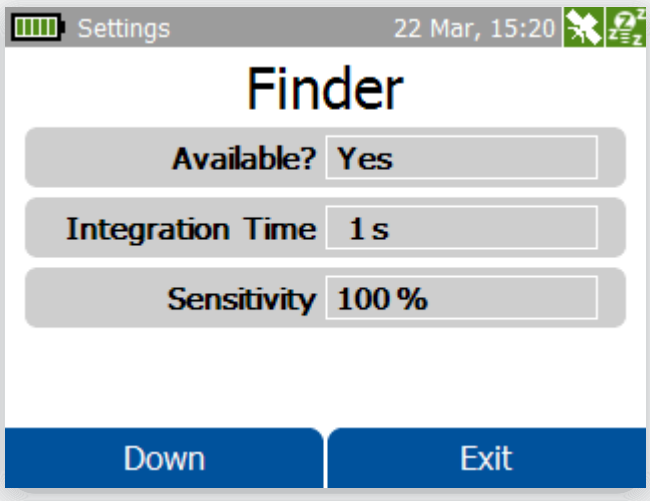

Figure 172. Finder settings

Settings and Commands

Available

Choose “Yes” to enable selection of Finder mode or “No” to disable.

Integration Time

Specify the time for which the FLIR identiFINDER R300 should average the measured count rate.

You can choose from 1 s – 2 s – 5 s.

The smaller the value, the more lively the display; the larger the value, the better the chance to find weaker sources.

Sensitivity

Specify the sensitivity for audible feedback in Finder mode (see 4.2, p. 88). You can specify values from 50 to 200 %.

While in Finder mode, the FLIR identiFINDER R300 emits sound when the count rate rises above a threshold C_s which is represented by the dashed line across the top of the Finder display (Figure 90, p. 89).

The threshold is related to the average background count rate $\langle BCR \rangle$ (measured when you enter the Finder mode), its variation $\sigma = \sqrt{\langle BCR \rangle}$, and the sensitivity you specify here according to

$$C_s = \langle BCR \rangle + 3.5 * \sigma * \frac{100}{\text{Sensitivity [\%]}}$$

This equation is solved for some common values of the background variation σ in Table 2, p. 158. Look up the sensitivity value next to the desired σ and enter it.

Table 2. Finder Mode: Background variation vs. sensitivity

σ	Sensitivity [%]
7	50
6.5	54
6	58
5.5	64
5	70
4.5	78
4	88
3.5	100
3	117
2.5	140
2	175
1.75	200

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.31 Dose Rate Settings

Options Menu (p. 103) ➤ Dose Rate Settings

Settings (p. 180) ➤ General (p. 184) ➤ Measurement (p. 184)

This screen (Figure 173, p. 159) groups options that influence the display of dose and dose rate values (see 4.1, p. 86).

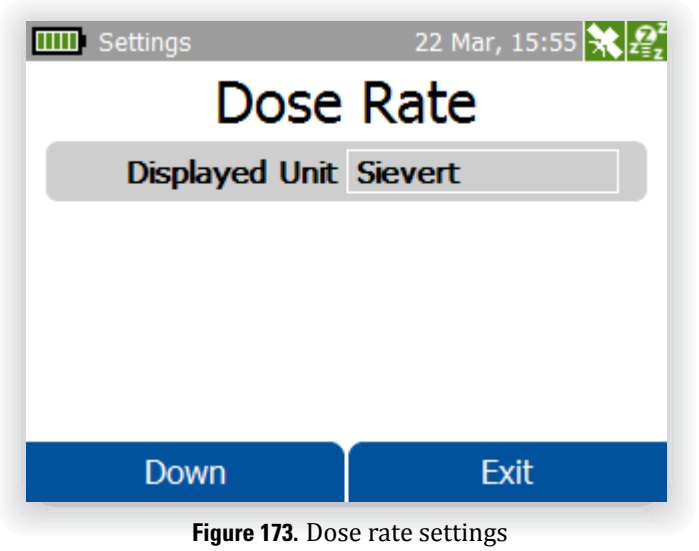

Figure 173. Dose rate settings

Settings and Commands

Displayed Unit

Choose the unit for the display of dose rates.

This setting influences **all** displays of dose and dose rate values, for example the display of dose alarm thresholds (see 6.33, p. 161).

Sievert

Sievert is a derived unit according to the International System of Units and the legally prescribed unit in many jurisdictions.

rem Röntgen equivalent in man. rem is an outdated unit and no longer allowed in many jurisdictions.

1 Sv = 100 rem.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.32 Alarm Indicators

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Alarm Indicators

Settings (p. 180) ➤ Alarm (p. 188) ➤ Alarm Indicators (p. 188)

The FLIR identiFINDER R300 reports various events with on-screen messages. Additionally, you can have it report events, especially alarms, with other methods (Figure 174, p. 160). You can switch each of the annunciation methods independently.

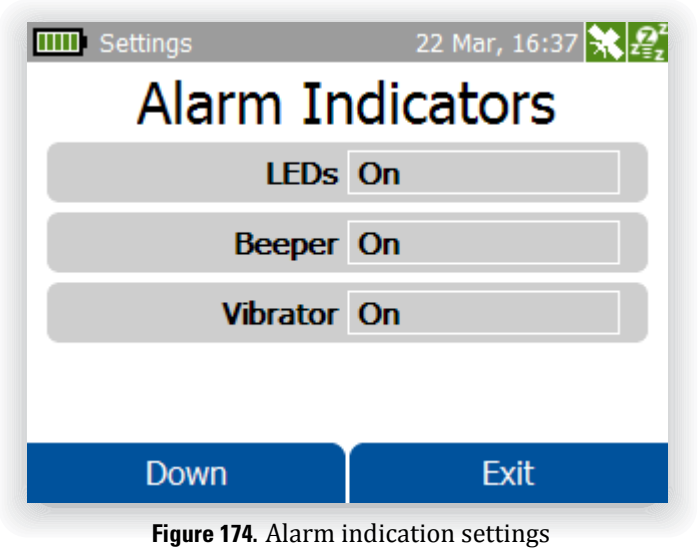

Figure 174. Alarm indication settings

The signals used to report alarms are detailed in chapter 5, p. 97.

Settings and Commands

LEDs

Switch the alarm LEDs on or off.

This setting does not affect the power status LED. It cannot be switched off.

Beeper

Switch the beeper on or off.

Vibrator

Switch the vibrator on or off.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.33 Dose Alarm Thresholds

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Dose Alarm Thresholds

Settings (p. 180) ➤ Alarm (p. 188) ➤ Gamma Alarms (p. 189)

This screen (Figure 175, p. 161) groups the thresholds for dose alarms and warnings.

Specify the thresholds by setting a value with a unit. The base unit (Sv or rem) available here reflects your preferences (see 6.31, p. 159).

You can specify values between 1 nSv and 1 Sv (100 nrem to 100 rem).

For meaningful alerts, specify an alarm threshold above the warning threshold.

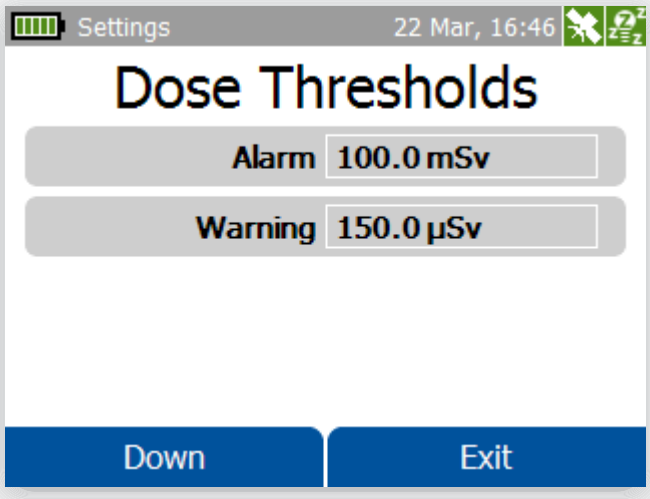

Figure 175. Dose alarm threshold settings

Settings and Commands

Alarm

The value with unit for the alarm threshold. Use “Off” (the lowest value) to suppress this alarm. Available units are

nSv – µSv – mSv – Sv (nrem – µrem – mrem – rem)

Warning

The value with unit for the warning threshold. Use “Off” (the lowest value) to suppress this warning. Available units are

nSv – µSv – mSv – Sv (nrem – µrem – mrem – rem)

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Left, Right

Edit composite values, see 2.2.4, p. 40 for details.

Exit

Return to the superior menu.

6.34 Dose Rate Alarm Thresholds

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Dose Rate Alarm Thresholds

Settings (p. 180) ➤ Alarm (p. 188) ➤ Gamma Alarms (p. 189)

This screen (Figure 176, p. 163) groups the thresholds for dose rate alarms and warnings.

Specify the thresholds by setting a value with a unit. The base unit (Sv/h or rem/h) available here reflects your preferences (see 6.31, p. 159).

You can specify values between 1 nSv/h and 1 Sv/h (100 nrem/h to 100 rem/h).

For meaningful alerts, specify an alarm threshold above the warning threshold.

Settings and Commands

Alarm

The value with unit for the alarm threshold. Use “Off” (the lowest value) to suppress this alarm. Available units are

nSv/h – µSv/h – mSv/h – Sv/h (nrem/h – µrem/h – mrem/h – rem/h)

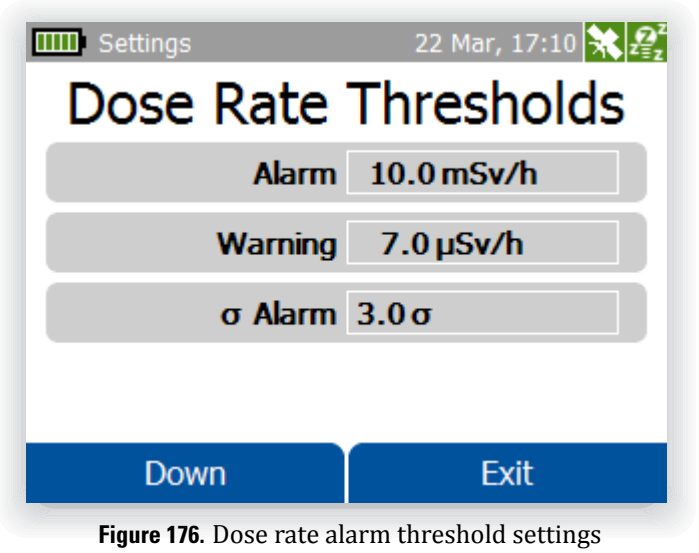

Figure 176. Dose rate alarm threshold settings

Warning

The value with unit for the warning threshold. Use “Off” (the lowest value) to suppress this alarm. Available units are

nSv/h – µSv/h – mSv/h – Sv/h (nrem/h – µrem/h – mrem/h – rem/h)

σ Alarm

The sensitivity of the detection of unusual gamma radiation increases (see 5.3, p. 101).

You can specify “Off” to suppress the notifications or a value from 1.1 to 9.9. The lower the value, the better the sensitivity for radiation increases but the more notifications you can expect. Higher values are recommended to reduce false notifications in environments with generally low radiation levels.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Left, Right

Edit composite values, see 2.2.4, p. 40 for details.

Exit

Return to the superior menu.

6.35 Neutron Alarm Thresholds

♦ This item is available for FLIR identiFINDER R300 variants with a neutron detector (see A.1, p. 237).

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Neutron Alarm Thresholds

Settings (p. 180) ➤ Alarm (p. 188) ➤ Neutron Alarms (p. 190)

This screen (Figure 177, p. 164) groups the thresholds for neutron warnings and alarms.

For meaningful alerts, specify an alarm threshold above the warning threshold.

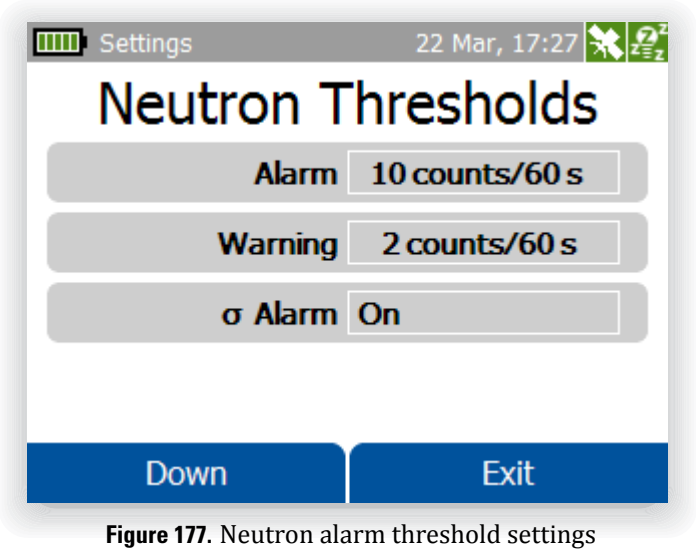

Figure 177. Neutron alarm threshold settings

Settings and Commands

Alarm

The minimum number of neutrons per minute to trigger an alarm.

You can specify values between 2 and 500.

Warning

The minimum number of neutrons per minute to trigger a warning.

You can specify values between 2 and 500.

σ Alarm

The state of notifications on unusual increase of neutrons detected (see 5.3, p. 101).

You can specify “On” or “Off”.

Down, Select

Choose and select menu items, see 2.2.2, p. 35 for details.

+, -, Accept, Cancel

Edit values, see 2.2.3, p. 37 for details.

Exit

Return to the superior menu.

6.36 Current Alarm State

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Current Alarm State

This screen (Figure 178, p. 165) is identical to the alarm screen always shown when a warning or an alarm is raised (compare 5, p. 97).

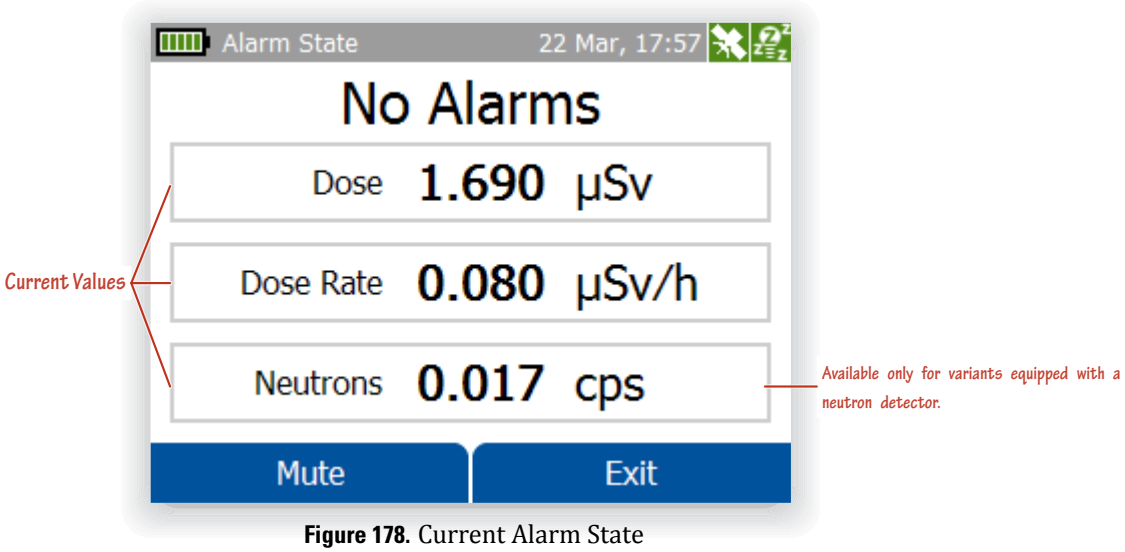

Figure 178. Current Alarm State

Settings and Commands

Mute

Switch off the beeper and vibrator for the current alarm, if any. The next alarm, if any, reactivates sound and vibration.

Exit

Return to the superior menu.

Chapter 7

Connecting the FLIR identiFINDER R300 to a Local Computer

The FLIR identiFINDER R300 can be connected to a computer via Universal Serial Bus (USB).

The connection between the FLIR identiFINDER R300 and the computer serves two purposes:

Energy Supply

The computer provides external power for running the FLIR identiFINDER R300 or charging the batteries. Refer to chapter 11, p. 229 for details.

Data Communication

The FLIR identiFINDER R300 supports several methods of data communication via USB which are explained in this and the following chapter.

Mass Storage Device

The FLIR identiFINDER R300 can behave as a mass storage device to transfer data to the computer.

⚠ This mode is exclusive, that is, no other data communication is possible while the FLIR identiFINDER R300 behaves as a mass storage device.

Web Server

The FLIR identiFINDER R300 can act as a web server you can access in a web browser to download data or to operate the FLIR identiFINDER R300 and change its settings with the enhanced convenience of a large screen and a real keyboard.

The remainder of this chapter explains:

- How to set up the physical connection (7.1, p. 168)
- How to use the FLIR identiFINDER R300 as a mass storage device (7.2, p. 170)
- How to prepare the computer (7.3, p. 171) for accessing the web interface detailed in chapter 8, p. 179.

7.1 Plugging and Unplugging

The FLIR identiFINDER R300 draws a current of approximately 400 mA. Before connecting to a computer, please make sure the USB outlet of the computer complies with this requirement. This might not be the case with some laptops, netbooks or similar battery powered devices.

Figure 179. Connecting the FLIR identiFINDER R300 (Mini USB-B connector) and a computer (USB-A connector)

The USB socket of the FLIR identiFINDER R300 is at the lower end of the instrument. It is covered by a flap in the rubber boot (Figure 180, p. 168).

Figure 180. USB socket covered by a flap in the rubber boot

Use the Mini USB-B to USB-A cable supplied with the FLIR identiFINDER R300 to establish the connection.

You can use any equivalent third-party USB 2.0 cable.

Always grab the plug at the strain relief and slide it straight into or out of the receptacle (Figure 181, p. 169).

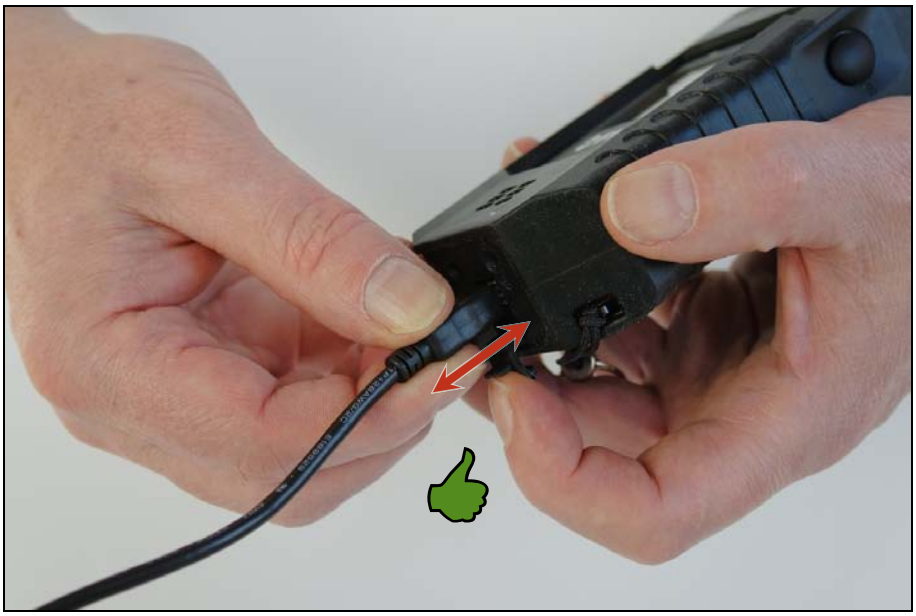

Figure 181. Plugging and unplugging the cable

Do not pull at the cable behind the connector and do not bend it when removing it from the FLIR identiFINDER R300 (Figure 182, p. 169).

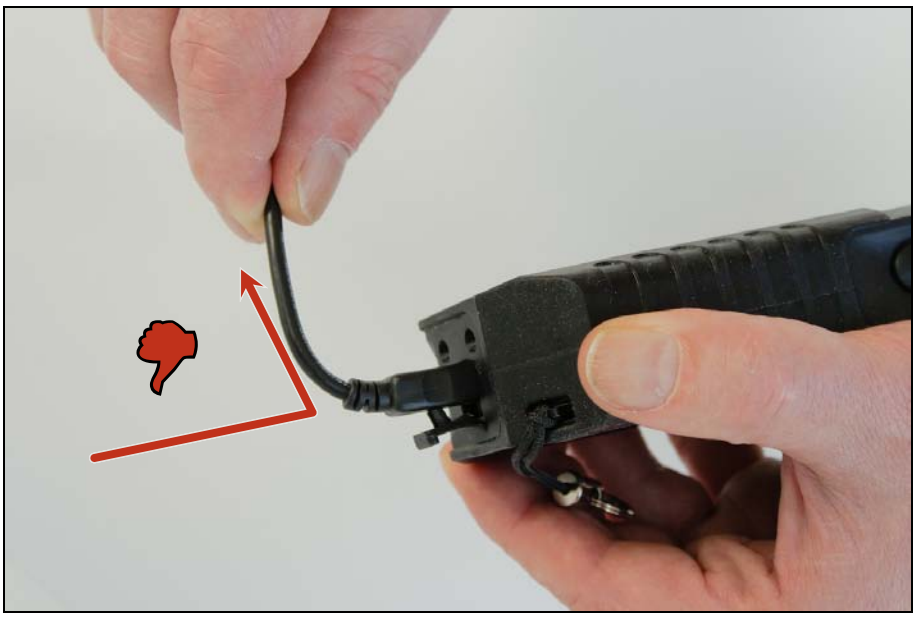

Figure 182. Do not bend the cable or the plug!

7.2 The FLIR identiFINDER R300 as a Mass Storage Device

Computers supporting the connection of USB devices usually have a driver for devices identifying themselves as mass storage, for example USB sticks or USB hard disks. The FLIR identiFINDER R300 supports the same standard.

You can use this mode of operation, for example, to install the drivers for the web interface access (7.3, p. 171).

➔ **To mount the FLIR identiFINDER R300 as USB mass storage**...

1. Switch the FLIR identiFINDER R300 to mass storage mode (see Mass Storage, 6.25, p. 150).
2. Connect the FLIR identiFINDER R300 to the computer with the included cable.

   The mass storage device shows up on your computer after a few moments (Figure 183, p. 170).

   The FLIR identiFINDER R300 hard drive is write protected, that is, you cannot modify or add any data.

Figure 183. FLIR identiFINDER R300 mounted as mass storage device on a computer running Microsoft Windows 7

➔ **To unmount the FLIR identiFINDER R300 as USB mass storage**...

1. Follow the standard procedure for unmounting mass storage devices as recommended by your operating system. Please refer to the manual or help system that came with your operating system for details.
2. Unplug the connection cable.
3. Press Exit on the FLIR identiFINDER R300 to return from USB mass storage mode to normal operation (see 6.25, p. 150).

7.3 Preparing the USB Network Connection on a Computer

Depending on the operating system of your computer, you might need to install additional software to access the web interface (see 8, p. 179) of the FLIR identiFINDER R300.

7.3.1 Linux

No special installation is required for recent Linux distributions. Fedora 13, Ubuntu 10.04, Ubuntu 11.04, and Ubuntu 12.04 were tested successfully. There should be a good chance with other modern distributions as well.

Just connect the FLIR identiFINDER R300 to the computer with the included cable and you are ready to go.

7.3.2 Windows XP

You must install the driver software included within the FLIR identiFINDER R300 before you can use the USB network connection of the FLIR identiFINDER R300.

⚠ This installation requires you to have administrator privileges for your computer. Ask your IT administrator if in doubt.

The driver installer is included with the FLIR identiFINDER R300, you can access it via the USB mass storage mode (7.2, p. 170).

➔ **To install the driver software**...

1. Start the mass storage connection from the FLIR identiFINDER R300 to your computer (see 7.2, p. 170).
2. Open the folder `Drivers` containing the installer.
3. Start the installer by double-clicking its icon (Figure 184, p. 171).

Figure 184. FLIR RNDIS driver installer

4. Follow the instructions given on-screen (Figure 185, p. 172).

   If a FLIR RNDIS driver is already installed on your PC, you will be guided through the deinstallation before the installation begins.

5. You might get asked whether to install this software (Figure 186, p. 172).
   Please click Continue Anyway.
   The installation will finish in a few moments (Figure 187, p. 173).

FLIR USB RNDIS Driver Setup
FLIR
Welcome
Welcome to the installer for the
FLIR USB RNDIS Driver 1.0
It is strongly recommended that you exit all Windows programs before continuing with this installation.
If you have any other programs running, please click Cancel, close the programs, and run this setup again.
Otherwise please click Install to proceed with the installation.
Install
Cancel

Figure 185. Beginning of the installation

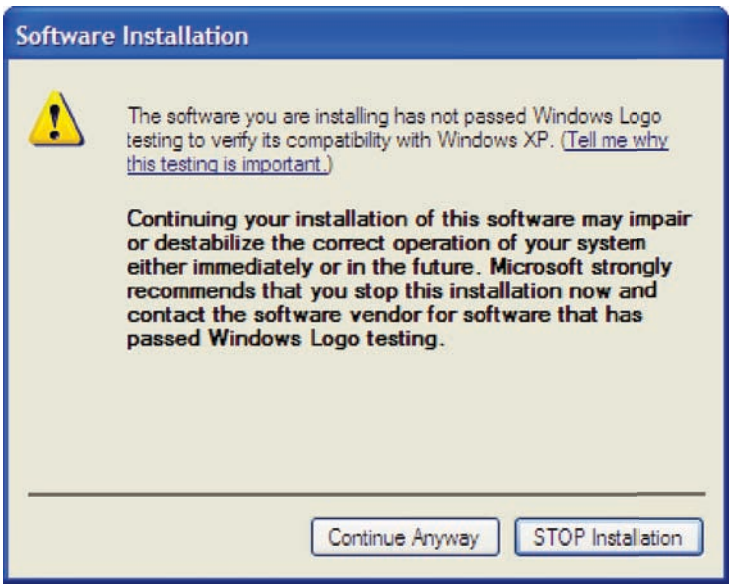
Software Installation
The software you are installing has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the software vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

Figure 186. Installation warning

6. Stop the mass storage connection from the FLIR identiFINDER R300 to your computer (see 7.2, p. 170).

Whenever you connect a computer and a FLIR identiFINDER R300 which is not in the USB mass storage mode, the FLIR identiFINDER R300 identifies itself as an RNDIS device. A computer running Microsoft Windows XP detecting the device checks whether the device is known and will report the detection of new hardware if not (Figure 188, p. 173).

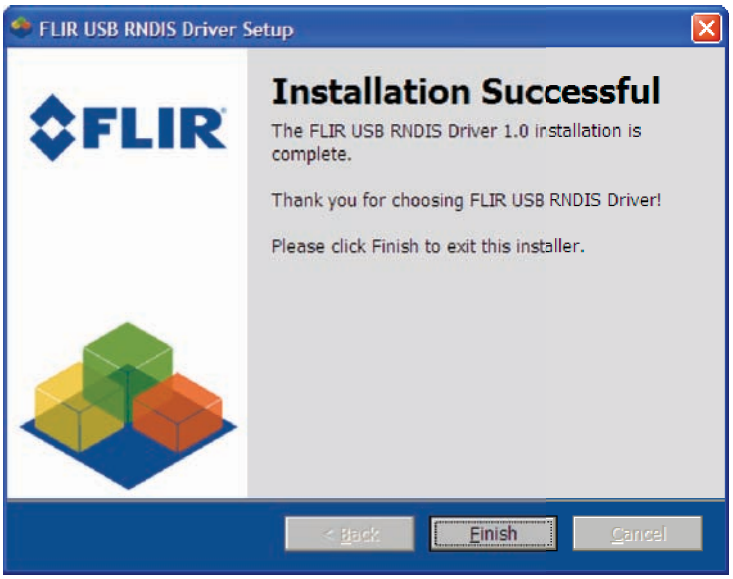
FLIR USB RNDIS Driver Setup
FLIR
Installation Successful
The FLIR USB RNDIS Driver 1.0 installation is complete.
Thank you for choosing FLIR USB RNDIS Driver!
Please click Finish to exit this installer.
< Back
Finish
Cancel

Figure 187. End of the installation

Figure 188. Windows XP reporting new hardware at the notification area.

➔ **To install the software for new hardware**…

Windows launches the wizard for new hardware (Figure 189, p. 173).

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Figure 189. Windows XP New Hardware Wizard

1. Click (◉ No, not this time) to avoid searching the Internet for a driver.

2. Proceed to the following page (Figure 190, p. 174) by clicking Next.

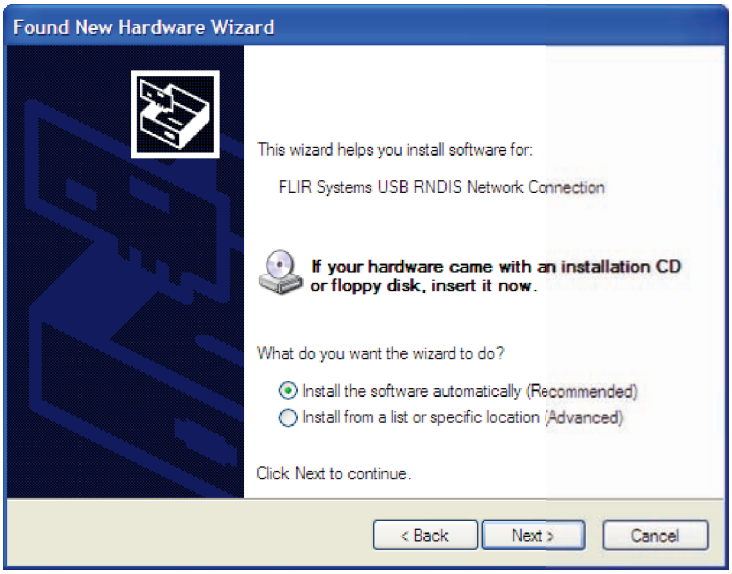
Found New Hardware Wizard
This wizard helps you install software for:
FLIR Systems USB RNDIS Network Connection
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 190. Specifying a driver source

3. Click ◉ Install the software automatically (Recommended) to have the system search for the driver you installed as described above.
4. Proceed to the following page by clicking Next.
5. You might get asked whether to install this software (Figure 191, p. 174).

   Please click Continue Anyway.

Hardware Installation
The software you are installing for this hardware:
FLIR Systems USB RNDIS Network Connection
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

Figure 191. Installation warning

The installation will finish in a few moments and you get notified in the notification area (Figure 192, p. 175).

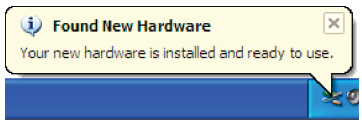

Figure 192. End of the installation

6. You are now ready to use the web interface of your FLIR identiFINDER R300 (see 8, p. 179).

   You will have to repeat these steps for every FLIR identiFINDER R300 you connect to your computer, sometimes even if you connect the same instrument to a different USB port of your computer.

➔ **To remove the driver software**…

1. Open the Windows System Control Panel.
2. Open `Add/Remove Software`.
3. Select the `FLIR RNDIS Driver` from the list by clicking its entry.
4. Click Remove and follow the instructions given on-screen.

7.3.3 Windows Vista, Windows 7

You must install the driver software included within the FLIR identiFINDER R300 before you can use the USB network connection of the FLIR identiFINDER R300.

Microsoft Windows Vista and Windows 7 behave virtually identical regarding this installation. The following screenshots are taken from Windows 7.

This installation requires you to have administrator privileges for your computer. Ask your IT administrator if in doubt.

The driver installer is included with the FLIR identiFINDER R300, you can access it via the USB mass storage mode (7.2, p. 170).

➔ **To install the driver software**…

1. Start the mass storage connection from the FLIR identiFINDER R300 to your computer (see 7.2, p. 170).
2. Open the folder `Drivers` containing the installer.
3. Start the installer by double clicking its icon (Figure 193, p. 176).

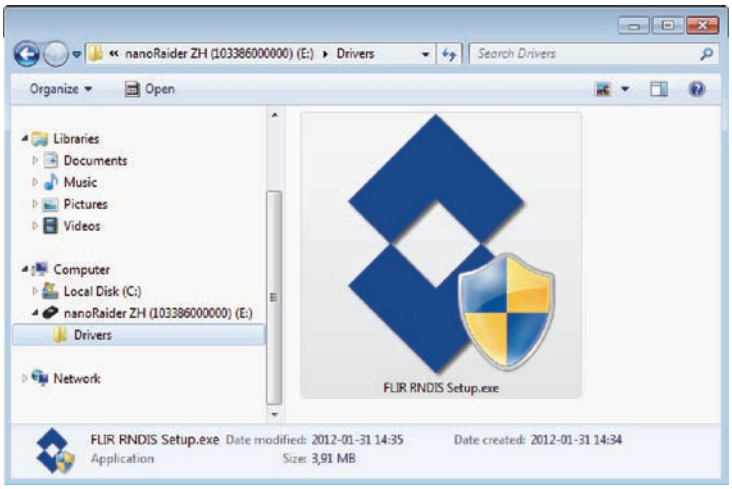

Figure 193. FLIR RNDIS driver installer

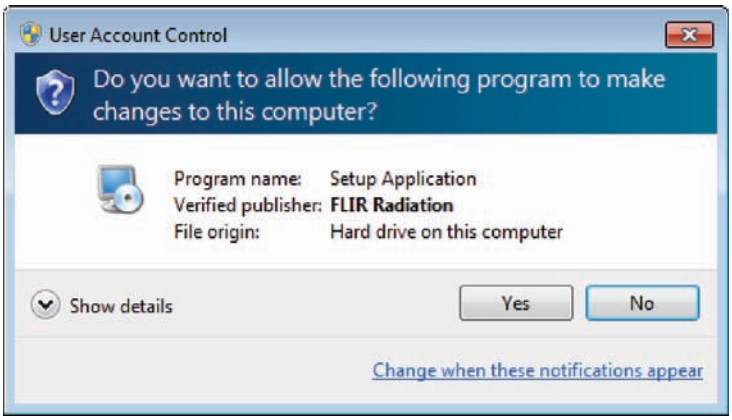
User Account Control
Do you want to allow the following program to make changes to this computer?
Program name: Setup Application
Verified publisher: FLIR Radiation
File origin: Hard drive on this computer
Show details
Yes
No
Change when these notifications appear

Figure 194. Installation warning

4. You will be asked whether you want to allow the installation of software (Figure 194, p. 176). Please click Yes.
5. Follow the instructions given on-screen (Figure 195, p. 177).

   If a FLIR RNDIS driver is already installed on your PC, you will be guided through the deinstallation before the installation begins.

   The installation will finish in a few moments (Figure 196, p. 177).
6. Stop the mass storage connection from the FLIR identiFINDER R300 to your computer (see 7.2, p. 170).

Whenever you connect a computer and a FLIR identiFINDER R300 which is not in the USB mass storage mode, the FLIR identiFINDER R300 identifies itself as an RNDIS device. A computer running Microsoft Windows Windows 7 detecting the device checks whether the device is known and will report the detection of new hardware if not (Figure 197, p. 177).

FLIR USB RNDIS Driver Setup
FLIR
Welcome
Welcome to the installer for the
FLIR USB RNDIS Driver 1.0
It is strongly recommended that you exit all Windows programs before continuing with this installation.
If you have any other programs running, please click Cancel, close the programs, and run this setup again.
Otherwise please click Install to proceed with the installation.
Install
Cancel

Figure 195. Beginning of the installation

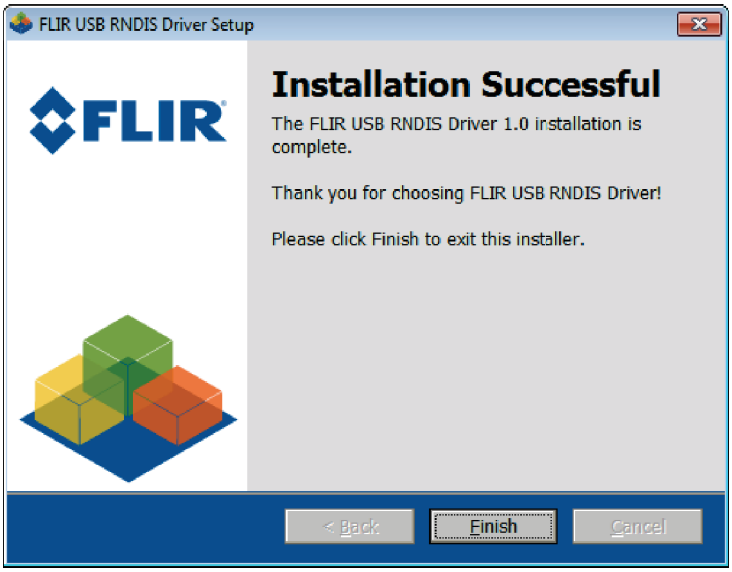
FLIR USB RNDIS Driver Setup
FLIR
Installation Successful
The FLIR USB RNDIS Driver 1.0 installation is complete.
Thank you for choosing FLIR USB RNDIS Driver!
Please click Finish to exit this installer.
< Back
Finish
Cancel

Figure 196. End of the installation

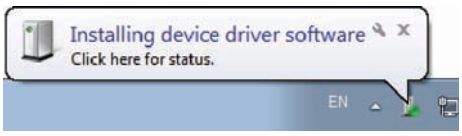

Figure 197. Windows 7 reporting and configuring new hardware

The system installs the driver software for the device and reports when the device is ready to use in the notification area (Figure 198, p. 178).

You are now ready to use the web interface of your FLIR identiFINDER R300 (see 8, p. 179).

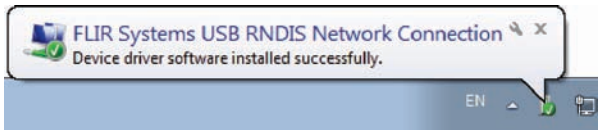

Figure 198. End of the installation

➔ **To remove the driver software**...

1. Open the Windows System Control Panel.
2. Open `Program\Programs and Features`.
3. Select the `FLIR RNDIS Driver` from the list by clicking its entry.
4. Click Uninstall and follow the instructions given on-screen.

7.4 Using the Network Connection

When you connect the FLIR identiFINDER R300 to an appropriately configured computer (see 7.3, p. 171), it will show its addresses (Figure 199, p. 178).

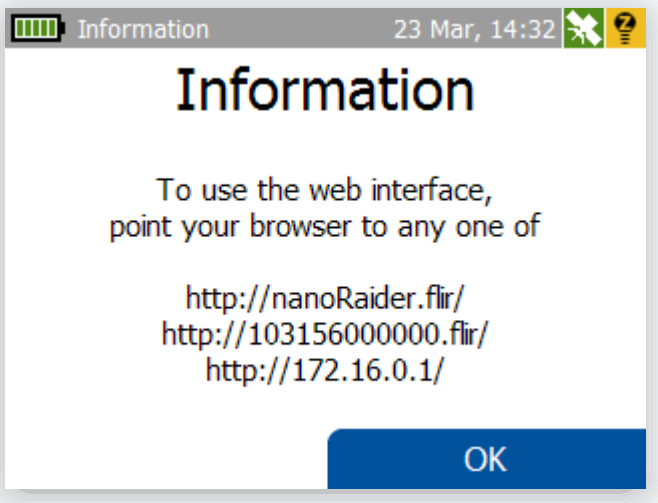

Figure 199. Valid addresses of the FLIR identiFINDER R300 after a connection to a computer was established

One address contains the serial number of your FLIR identiFINDER R300, the other is an IP address according to the current settings (see 6.26, p. 152). To access the FLIR identiFINDER R300's web interface, simply point your web browser to one of the given addresses, for example to the IP address `http://172.16.0.1`

⚠ Not all computers can use the address comprising the instrument's serial number. Please use the IP address in this case.

Chapter 8

Using the FLIR identiFINDER R300 Web Server

In principle, the web interface provides all the settings and commands you know from the FLIR identiFINDER R300 itself, but with the added convenience of a larger screen and a real keyboard.

Point your web browser to the address given after establishing a network connection (see 7.4, p. 178). Please refer to section 2.4, p. 51 for the principle operation of the web pages outlined below.

The main menu offers the following groups of web pages:

Home

Inspect general information about the FLIR identiFINDER R300

Settings

Inspect and edit settings of the FLIR identiFINDER R300

Data

Inspect and download data from the FLIR identiFINDER R300's database

Live Screen

Remote control the screen and buttons of the FLIR identiFINDER R300

Live Spectrum

Acquire and analyze gamma spectra with the FLIR identiFINDER R300

Administration

Manage the FLIR identiFINDER R300 and install software updates

The complete hierarchy of web pages in the main and secondary menus and their sections is shown in the following list. References point to the manual sections explaining the listed items in more detail.

Home

- **Info** ..... see 8.1, p. 181
  - **System** ..... see 8.1, p. 181
  - **Service** ..... see 8.1, p. 181

- Resources ..... see 8.2, p. 182
  - Open-Source Software ..... see 8.2, p. 182
  - Data Schemata ..... see 8.2, p. 183

Settings

- General ..... see 8.3, p. 184
  - Measurement ..... see 8.3.1, p. 184
  - Identification ..... see 8.3.2, p. 184
  - User Interface ..... see 8.3.3, p. 186
- GPS and Clock ..... see 8.4, p. 186
  - GPS ..... see 8.4, p. 186
  - Clock ..... see 8.4, p. 187
- Alarm ..... see 8.5, p. 188
  - Alarm Indicators ..... see 8.5.1, p. 188
  - Gamma Alarms ..... see 8.5.2, p. 189
  - Neutron Alarms ♦ ..... see 8.5.3, p. 190
- Connectivity ..... see 8.6, p. 190
  - Local Area Network ..... see 8.6.1, p. 190
  - Remote Server ..... see 8.6.2, p. 192
  - Reports ..... see 8.6.3, p. 192
  - Download Options ..... see 8.6.4, p. 192
- Bluetooth SPP Settings ♦ ..... see 8.7, p. 192
  - Bluetooth SPP Settings ♦ ..... see 8.7.1, p. 192
- Nuclides ..... see 8.8, p. 193
- Backup ..... see 8.9, p. 194
  - Backup ..... see 8.9, p. 196
  - Restore ..... see 8.9, p. 196

Data

- Bulk Download ..... see 8.10, p. 197
  - Date Selection ..... see 8.10, p. 197
  - Data Types ..... see 8.10, p. 197
- Identifications ..... see 8.11, p. 199
- Spectra ..... see 8.12, p. 202
- Alarms ..... see 8.13, p. 206
- Screenshots ..... see 8.14, p. 207

Live Screen ..... see 8.15, p. 208

Live Spectrum ..... see 8.16, p. 209
Administration
- Software Update ..... see 8.17, p. 215
- Password ..... see 8.18, p. 215
- System Files ..... see 8.19, p. 216
  - Available Files ..... see 8.19, p. 216

8.1 Info (Web Page)

Home (p. 179) ➤ Info

This web page displays diverse information regarding your FLIR identiFINDER R300 (Figure 200, p. 182).

System

This section (Figure 200, p. 182) contains information about the FLIR identiFINDER R300 and its configuration.

Home (p. 179) ➤ Info (p. 181) ➤ System

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Show Status (p. 130)

You should have this information ready when contacting our service (see 8.1, p. 181 or B.4, p. 257).

Service

This section (Figure 200, p. 182) contains the addresses of our service for various communication methods like traditional mail, fax, etc.

Home (p. 179) ➤ Info (p. 181) ➤ Service

If you click the link to a service e-mail address, your standard e-mail software will open with a new message already containing the relevant data of the FLIR identiFINDER R300 like serial number, versions etc.

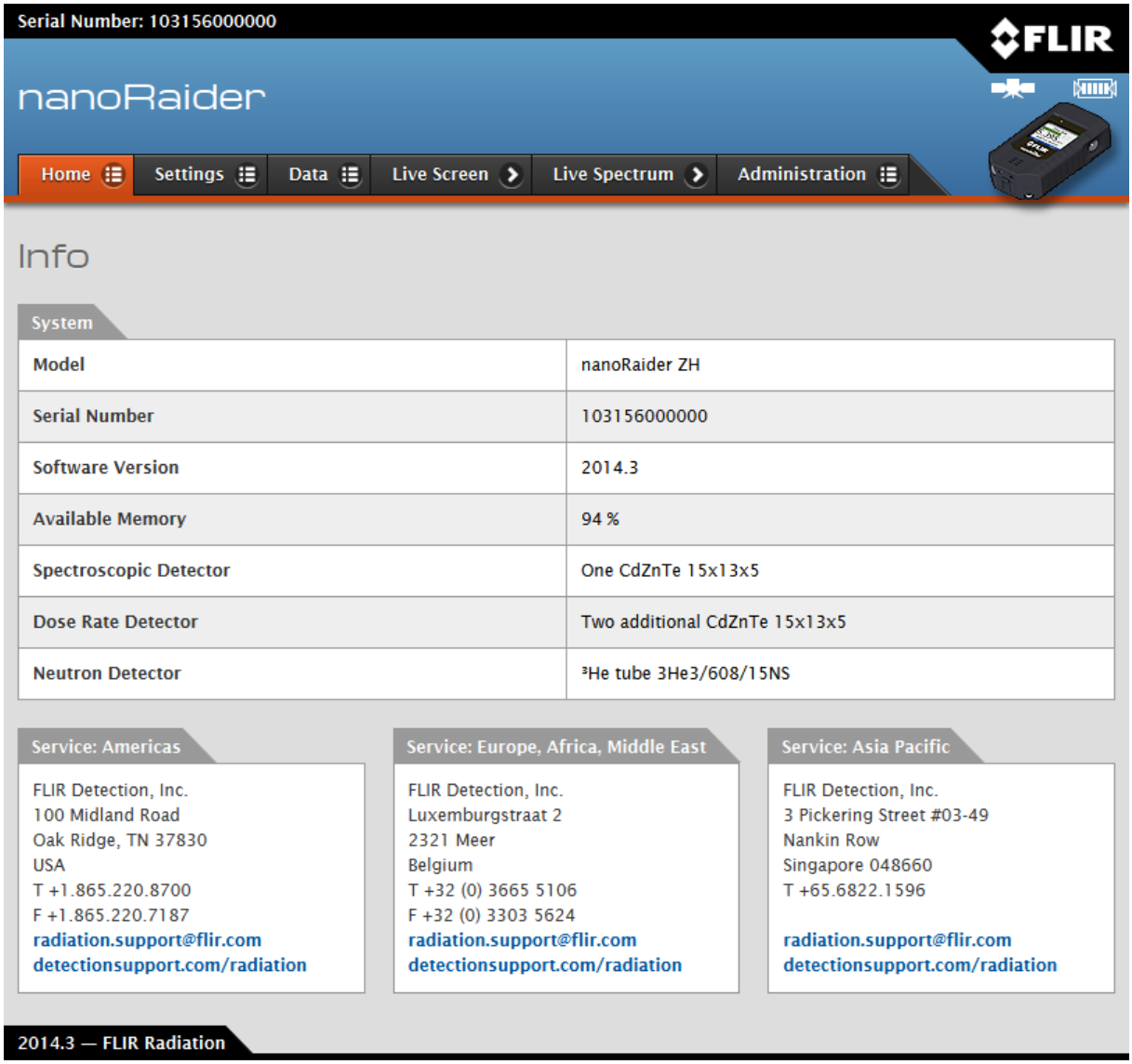

Figure 200. Info web page

8.2 Resources (Web Page)

Home (p. 179) ➤ Resources

This web page (Figure 201, p. 183) provides access to various resources stored on the FLIR identiFINDER R300.

Open-Source Software

This section (Figure 201, p. 183) provides information about the open-source libraries used in the software of the FLIR identiFINDER R300.

Home (p. 179) ➤ Resources (p. 182) ➤ Open-Source Software

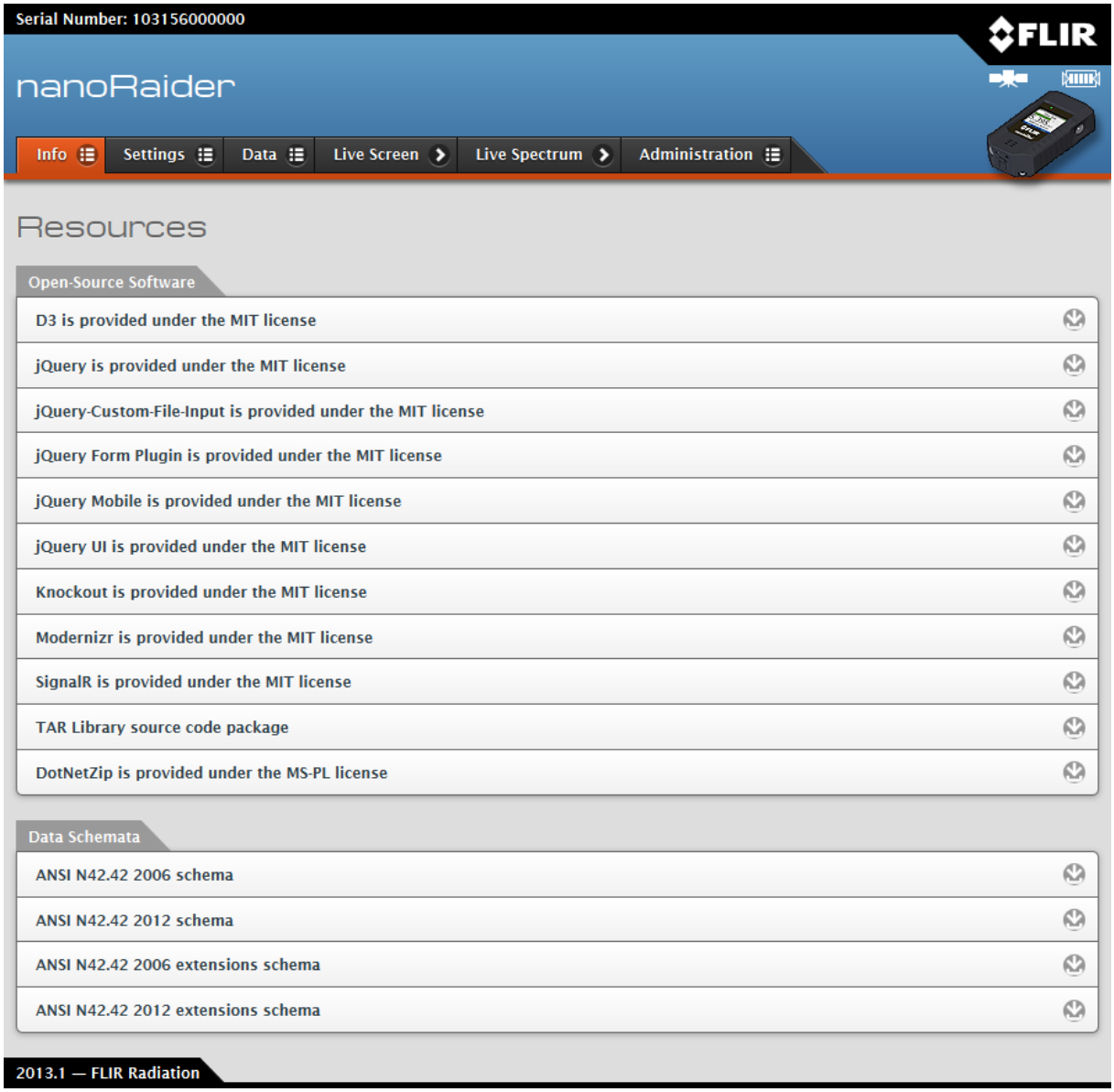
Serial Number: 103156000000
FLIR
nanoRaider
Info
Settings
Data
Live Screen
Live Spectrum
Administration
Resources
Open-Source Software
D3 is provided under the MIT license
jQuery is provided under the MIT license
jQuery-Custom-File-Input is provided under the MIT license
jQuery Form Plugin is provided under the MIT license
jQuery Mobile is provided under the MIT license
jQuery UI is provided under the MIT license
Knockout is provided under the MIT license
Modernizr is provided under the MIT license
SignalR is provided under the MIT license
TAR Library source code package
DotNetZip is provided under the MS-PL license
Data Schemata
ANSI N42.42 2006 schema
ANSI N42.42 2012 schema
ANSI N42.42 2006 extensions schema
ANSI N42.42 2012 extensions schema
2013.1 — FLIR Radiation

Figure 201. Resources web page

Download

Download the license or the source code of a library from the FLIR identiFINDER R300 to your computer.

Data Schemata

This section (Figure 201, p. 183) offers the XML schemata describing the `*.xml` files you can download or send from your FLIR identiFINDER R300.

Home (p. 179) ➤ Resources (p. 182) ➤ Data Schemata

The schemata help you to interpret the files and to develop your own software for further processing the files.

Download

Download a schema from the FLIR identiFINDER R300 to your computer.

8.3 General (Web Page)

Settings (p. 180) ➤ General

This web page (Figure 202, p. 185) provides access to various settings of the FLIR identiFINDER R300 for inspection or editing.

To transfer your changes to the FLIR identiFINDER R300, click Save.

8.3.1 Measurement

Settings (p. 180) ➤ General (p. 184) ➤ Measurement

This web page section (Figure 202, p. 185) lets you inspect or edit settings related to the measurement of gamma radiation.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ Dose Rate Settings (p. 159)

Options Menu (p. 103) ➤ Finder Settings (p. 157)

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Data Logging (p. 104) ➤ Automated Mode Settings (p. 135)

8.3.2 Identification

Settings (p. 180) ➤ General (p. 184) ➤ Identification

This web page section (Figure 202, p. 185) lets you inspect or edit settings regarding measurement and presentation of identification results.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Identification Options (p. 103) ➤ Identification Settings (p. 116)

Figure 202. General Settings web page

8.3.3 User Interface

Settings (p. 180) ➤ General (p. 184) ➤ User Interface

This web page section (Figure 202, p. 185) lets you inspect or edit settings regarding the screen and keyboard of the FLIR identiFINDER R300.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ General Options (p. 104) ➤ Display Settings (p. 122)

8.4 GPS and Clock (Web Page)

Settings (p. 180) ➤ GPS and Clock

This settings web page lets you inspect and specify GPS location and clock settings of the FLIR identiFINDER R300.

GPS

This web page section (Figure 203, p. 187) lets you inspect and edit GPS settings of the FLIR identiFINDER R300.

Settings (p. 180) ➤ GPS and Clock (p. 186) ➤ GPS

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ General Options (p. 104) ➤ GPS Settings (p. 127)

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Maintenance (p. 104) ➤ Show Status (p. 130)

◉ GPS

Switch the GPS receiver On or Off.

If the GPS receiver is on and the reception is good enough, the GPS coordinates of the current location are stored with measurement results.

If the GPS reception is not good enough, for example inside buildings, the current location cannot be determined. If a location could be determined from GPS data since you switched on the FLIR identiFINDER R300, the last valid location is used. Otherwise, the position of the intersection of the Greenwich Meridian with the Equator is used (0° N, 0° E).

Additionally, the clock of the FLIR identiFINDER R300 is set according to the high-precision time received from the GPS satellites.

Save

Transfer your changes to the FLIR identiFINDER R300.

GPS Coordinates

The current location of the FLIR identiFINDER R300, if GPS is on and receives satellite data.

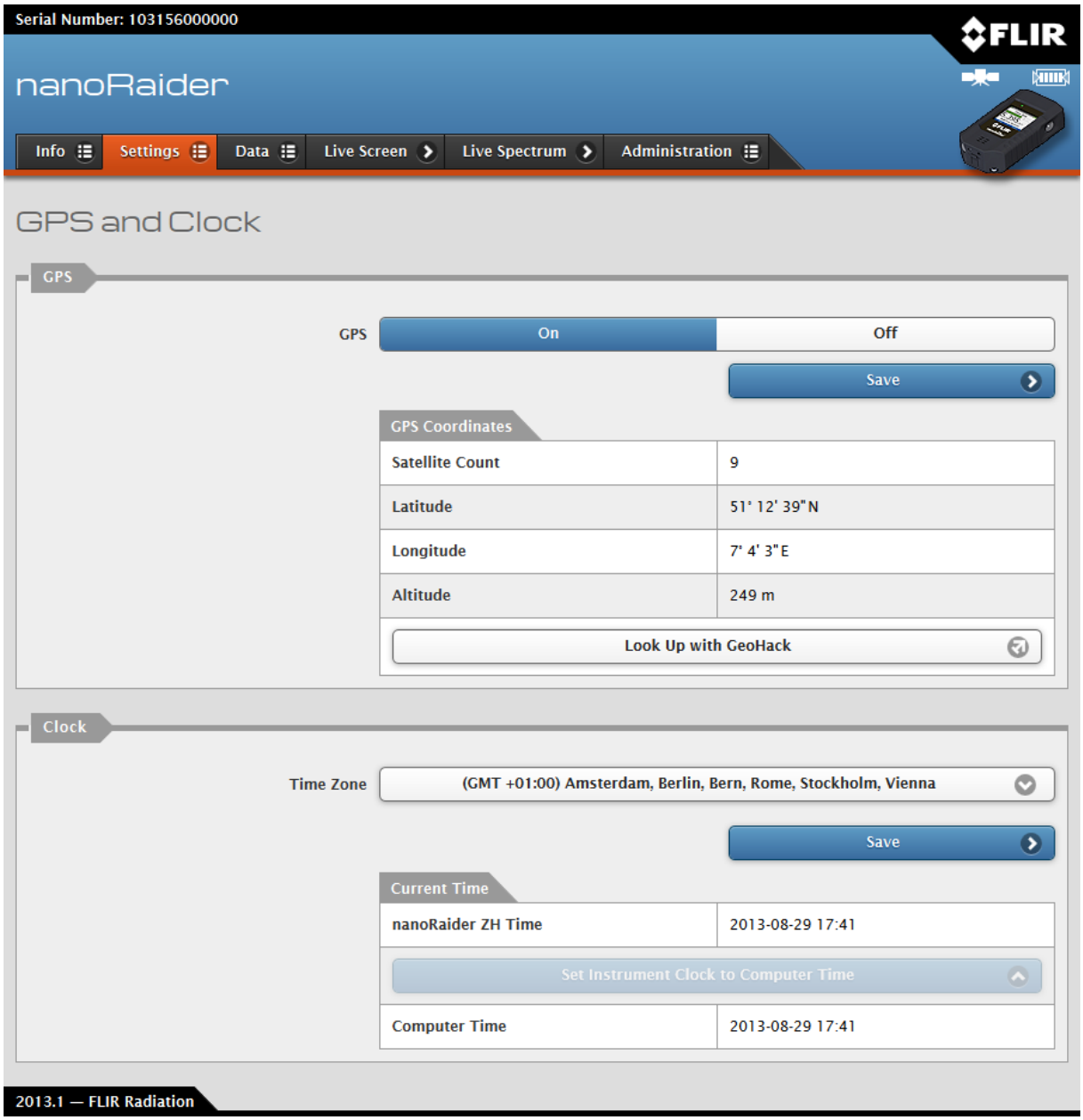

Figure 203. The GPS and Clock settings web page

Look Up with GeoHack

Sends the shown GPS coordinates to the GeoHack page on the Wikimedia Toolserver, a free service of Wikimedia Deutschland e.V. (Internet access required).

The service links to international servers of maps, satellite images, aerial photographs etc. which cover the coordinates saved with your record.

Clock

This web page section (Figure 203, p. 187) lets you inspect and edit settings for the clock of the FLIR identiFINDER R300.

Settings (p. 180) ➤ GPS and Clock (p. 186) ➤ Clock

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ General Options (p. 104) ➤ Clock Settings (p. 125)

Time Zone ▼

Select your time zone from the list built into the FLIR identiFINDER R300. Time zones are specified as offset from UTC/GMT.

Periods for daylight savings time, however, might be different for the same offset from UTC in various regions. To have the FLIR identiFINDER R300 consider the correct daylight savings time for your time zone, make sure to check the region info when selecting the offset.

Save

Transfer your changes to the FLIR identiFINDER R300.

Current Time

The current time of the FLIR identiFINDER R300 and your computer.

Set Instrument Clock to Computer Time

If the FLIR identiFINDER R300 does not get the current time via GPS, you can set the internal clock by setting it to the current time of your computer.

8.5 Alarm (Web Page)

Settings (p. 180) ➤ Alarm

This web page (Figure 204, p. 189) provides access to alarm settings of the FLIR identiFINDER R300 for inspection or editing.

To transfer your changes to the FLIR identiFINDER R300, click Save.

8.5.1 Alarm Indicators

Settings (p. 180) ➤ Alarm (p. 188) ➤ Alarm Indicators

This web page section (Figure 204, p. 189) lets you switch the alarm indicators of the FLIR identiFINDER R300 on or off.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Alarm Indicators (p. 160)

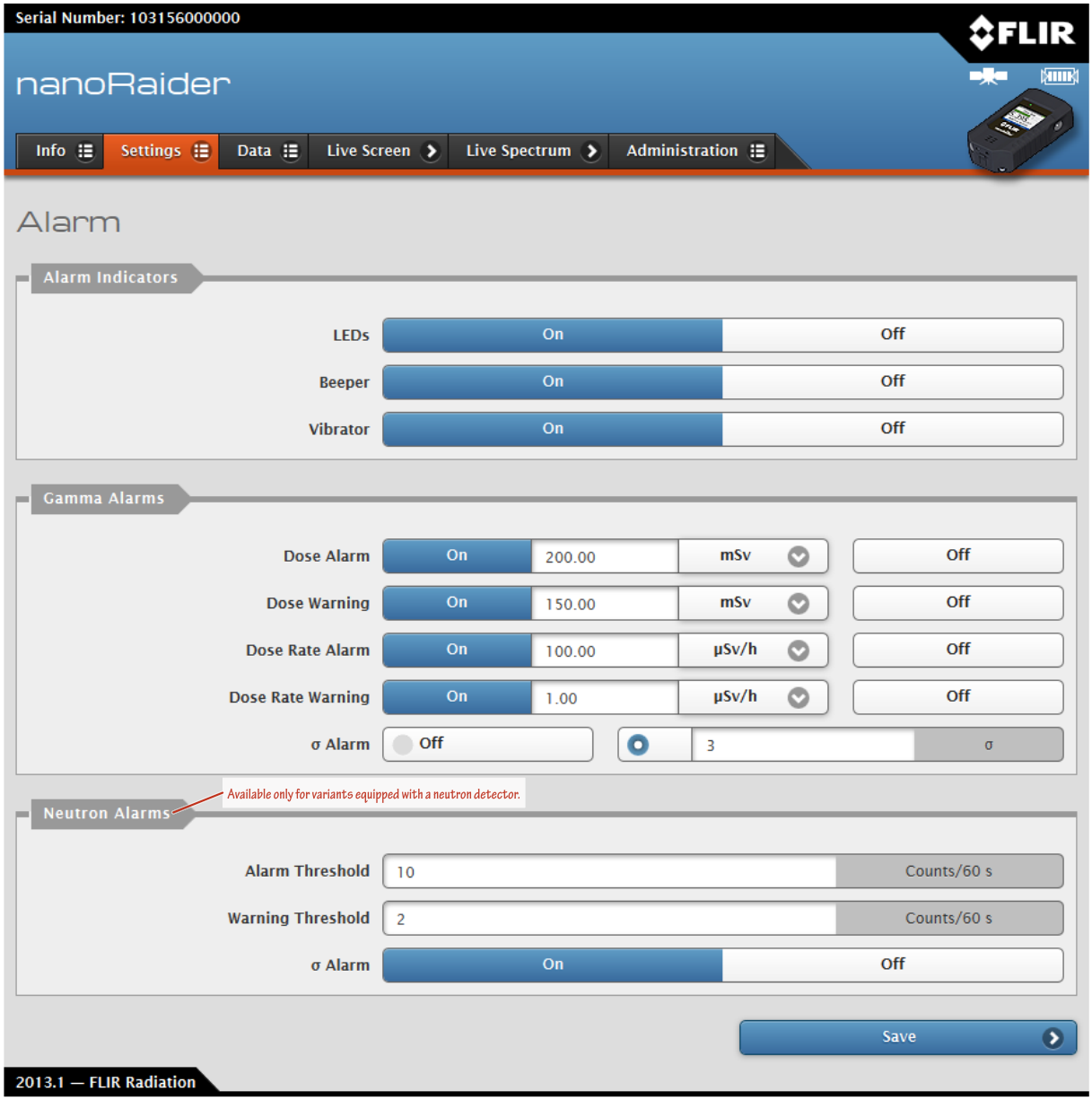

Figure 204. Alarm Settings web page

8.5.2 Gamma Alarms

Settings (p. 180) ➤ Alarm (p. 188) ➤ Gamma Alarms

This web page section (Figure 204, p. 189) lets you inspect or set the thresholds for gamma alarms and warnings.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Dose Alarm Thresholds (p. 161)

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Dose Rate Alarm Thresholds (p. 162)

8.5.3 Neutron Alarms

♦ This item is available for FLIR identiFINDER R300 variants with a neutron detector (see A.1, p. 237).

Settings (p. 180) ➤ Alarm (p. 188) ➤ Neutron Alarms

This web page section (Figure 204, p. 189) lets you inspect or set the thresholds for neutron alarms and warnings.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ Alarm Options (p. 105) ➤ Neutron Alarm Thresholds (p. 163)

8.6 Connectivity (Web Page)

Settings (p. 180) ➤ Connectivity

This web page (Figure 205, p. 191) comprises various settings of the FLIR identiFINDER R300 related to local and remote network connections.

To transfer your changes to the FLIR identiFINDER R300, click Save.

8.6.1 Local Area Network

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Local Area Network

This web page section (Figure 205, p. 191) lets you configure the connection of the FLIR identiFINDER R300 to a local area network.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Network (p. 152)

⚠ It is recommended to restart your FLIR identiFINDER R300 after changing network settings. If the FLIR identiFINDER R300 is currently connected to an external device, you have to reestablish the connection according to the new settings.

Figure 205. Connectivity Settings web page

8.6.2 Remote Server

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Remote Server

This web page section (Figure 205, p. 191) lets you configure the connection of the FLIR identiFINDER R300 to a remote server via Bluetooth Dial-Up Networking.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Remote Server Settings (p. 149)

8.6.3 Reports

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Reports

This web page section (Figure 205, p. 191) lets you configure the contents of reports generated by the FLIR identiFINDER R300.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Report Settings (p. 153)

8.6.4 Download Options

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Download Options

This web page section (Figure 205, p. 191) lets you specify the type of the files to be downloaded from the FLIR identiFINDER R300 to a connected computer.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Download Settings (p. 154)

8.7 Bluetooth SPP Settings (Web Page)

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Settings (p. 180) ➤ Bluetooth SPP Settings

This section automatically forwards to the Bluetooth SPP Options web page (see 8.7.1, p. 192).

8.7.1 Bluetooth SPP Settings (Web Page)

♦ This item is available for FLIR identiFINDER R300 variants with Bluetooth (see A.1, p. 237).

Settings (p. 180) ➤ Bluetooth SPP Settings (p. 192) ➤ Bluetooth SPP Settings

This web page (Figure 206, p. 193) allows you to enable and configure the Bluetooth SPP mode.

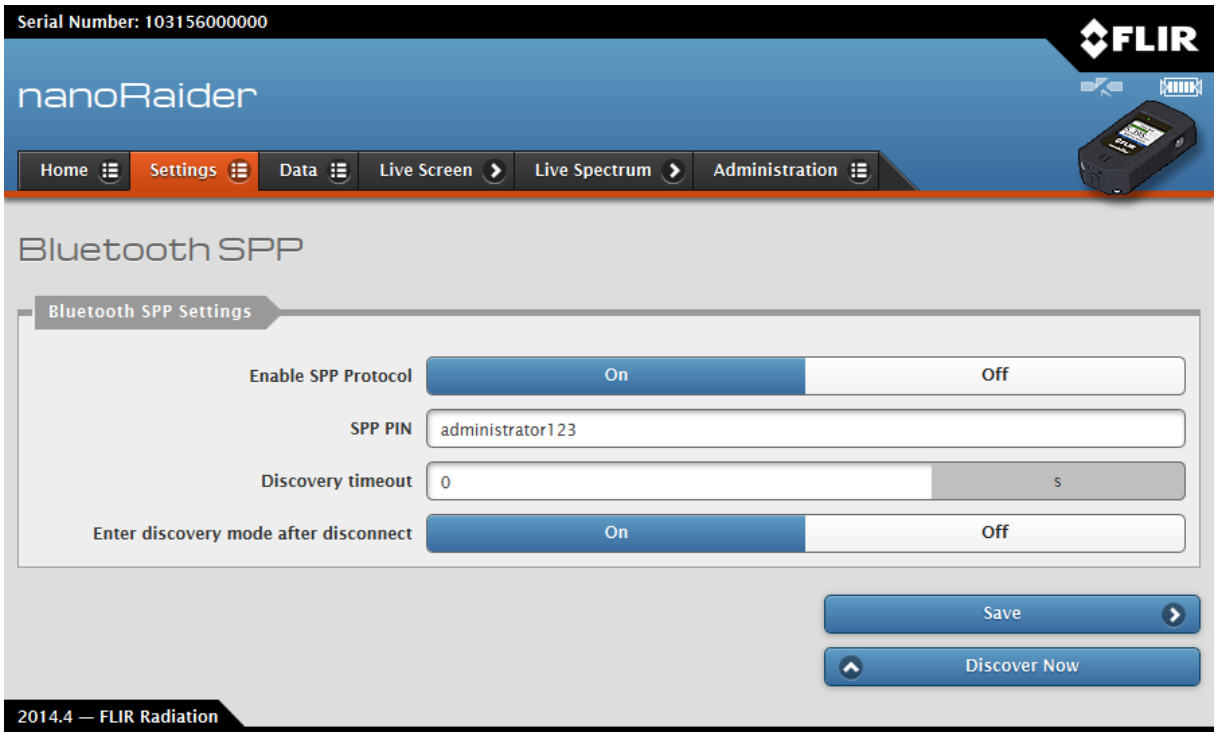

Figure 206. Bluetooth Settings web page

If **Enable SPP Protocol** is set to **On** then selecting Discover Now will make the FLIR identiFINDER R300 discoverable over Bluetooth for the **Discovery timeout** period.

SPP PIN displays the current PIN for connecting to the FLIR identiFINDER R300 via Bluetooth SPP mode. The PIN may be edited.

If **Enable discovery mode after disconnect** is set to **Off** then discovery of the FLIR identiFINDER R300 via Bluetooth will be disabled after a connection is terminated.

To transfer your changes to the FLIR identiFINDER R300, click Save.

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Bluetooth SPP (p. 104) ➤ Bluetooth SPP Status (p. 141) ➤ Bluetooth SPP Settings (p. 142)

8.8 Nuclides (Web Page)

Settings (p. 180) ➤ Nuclides

This web page (Figure 207, p. 194) lets you inspect and change nuclide data.

Figure 207. Nuclide Settings web page

You can access these settings on the instrument as well. Please find the details about the settings in chapter “FLIR identiFINDER R300 Reference” under

Options Menu (p. 103) ➢ More Options (p. 103) ➢ Identification Options (p. 103) ➢ Nuclide Visibility (p. 118)

Options Menu (p. 103) ➢ More Options (p. 103) ➢ Identification Options (p. 103) ➢ Nuclide Usage (p. 119)

Options Menu (p. 103) ➢ More Options (p. 103) ➢ Identification Options (p. 103) ➢ Nuclide Severity (p. 120)

⚠ The severity of some nuclides is fixed. In these cases, the menu to set the severity is inactive.

To transfer your changes to the FLIR identiFINDER R300, click Save.

8.9 Backup (Web Page)

Settings (p. 180) ➢ Backup

This web page (Figure 208, p. 195) lets you backup and restore the complete settings of the FLIR identiFINDER R300.

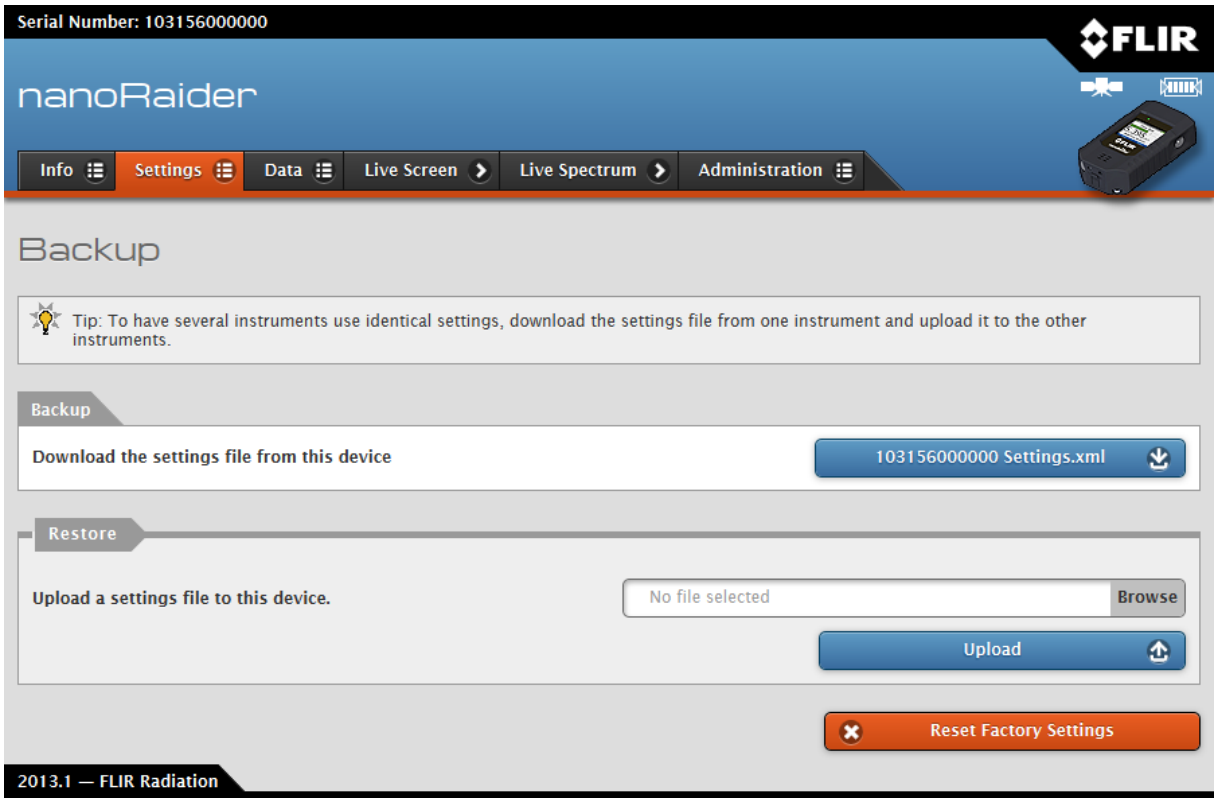

Figure 208. Backup web page

The instrument's settings are saved in an `*.xml` file. You can inspect or edit this file with common text editors supporting UTF-8 or with specialized XML editors.

The settings in the file are grouped into several categories and embedded comments help you find your way around.

```
<?xml version="1.0" encoding="utf-8"?>
<settings modelnumber="nanoRaider ZH" serialnumber="103156000000">
  <category name="Display">
...
  </category>
  <category name="Alarm Indications">
    <!--Are warnings and alarms reported by the beeper?-->
    <setting name="SoundAlarmIndication" value="True" />
    <!--Are warnings and alarms reported by the vibrator?-->
    <setting name="VibratorAlarmIndication" value="True" />
    <!--Are warnings and alarms reported by LEDs?-->
    <setting name="LightsAlarmIndication" value="True" />
  </category>
  <category name="Feedback">
...
  </category>
  <category name="Nuclide">
    <setting name="Ag-110m" value="True" />
    <setting name="Ag-110m-Usage" value="IND" />
    <setting name="Ag-110m-Severity" value="Innocent" />
    <setting name="Am-241" value="True" />
to be continued…
```

```
    <setting name="Am-241-Usage" value="IND" />
    <setting name="Am-241-Severity" value="Threatening" />
...
    <setting name="Xe-133" value="True" />
    <setting name="Xe-133-Usage" value="MED" />
    <setting name="Xe-133-Severity" value="Innocent" />
  </category>
</settings>
```

You can use this file, for example, to

- backup the settings and restore them after you experiment with various settings on the instrument,
- document the settings used in your team, or
- distribute identical settings to several instruments used in your team.

Uploaded settings files may be incomplete, that is, they may contain only some settings. Using this method, you can distribute some settings to several instruments while other settings remain unchanged on the individual instrument.

Backup

The name of a settings file starts with the serial number of the instrument.

… Settings.xml

Download the settings file to your computer.

Restore

Specify a settings file to be uploaded to your FLIR identiFINDER R300.

Settings File […]

Enter the path to the settings file.

Browse…

Use your computer's standard method to choose a settings file.

Upload

Transfer the file to the FLIR identiFINDER R300.

The software of the FLIR identiFINDER R300 will check the formal integrity of the file you uploaded.

If the uploaded file contains, for example, syntax errors or unknown settings, the complete file will be rejected and the settings of the instrument will remain unchanged.

In other words: you cannot damage the FLIR identiFINDER R300 by uploading a wrong or corrupt file. You can, however, upload a file with settings making no sense for your field of application.

If the settings file contains data for settings not supported on your FLIR identiFINDER R300, the setting will be accepted but is obviously meaningless.

You will be informed about success or failure after the upload.

Reset Factory Settings

Discard all changes you made to any of the FLIR identiFINDER R300's settings and reestablish the settings made at the factory.

The password (see 2.2.7, p. 46), if any, is reset to the factory setting as well.

8.10 Bulk Download (Web Page)

Data (p. 180) ➤ Bulk Download

This web page lets you download all or a selection of the data saved in your FLIR identiFINDER R300's database to your computer (Figure 209, p. 198). The records matching certain criteria will be wrapped into a `*.zip` archive and downloaded.

Date Selection

Limit the records to be downloaded by their saving date (in ISO 8601 notation).

A pop-up calendar helps you to enter the dates.

Several buttons are available to enter common date combinations (Today, Last Week, etc.).

Start Date [...]

The date of the oldest record to be downloaded. Leave this field empty to get the oldest record available in the database of the FLIR identiFINDER R300.

End Date [...]

The date of the youngest record to be downloaded. Leave this field empty to get the youngest record available in the database of the FLIR identiFINDER R300.

Data Types

Limit the records to be downloaded by their type.

The actual collection of available types depends on the variant of your FLIR identiFINDER R300.

☑ Identifications

Include identification results in the archive.

☑ Spectra

Include spectra in the archive.

☑ ...

Include other data types in the archive.

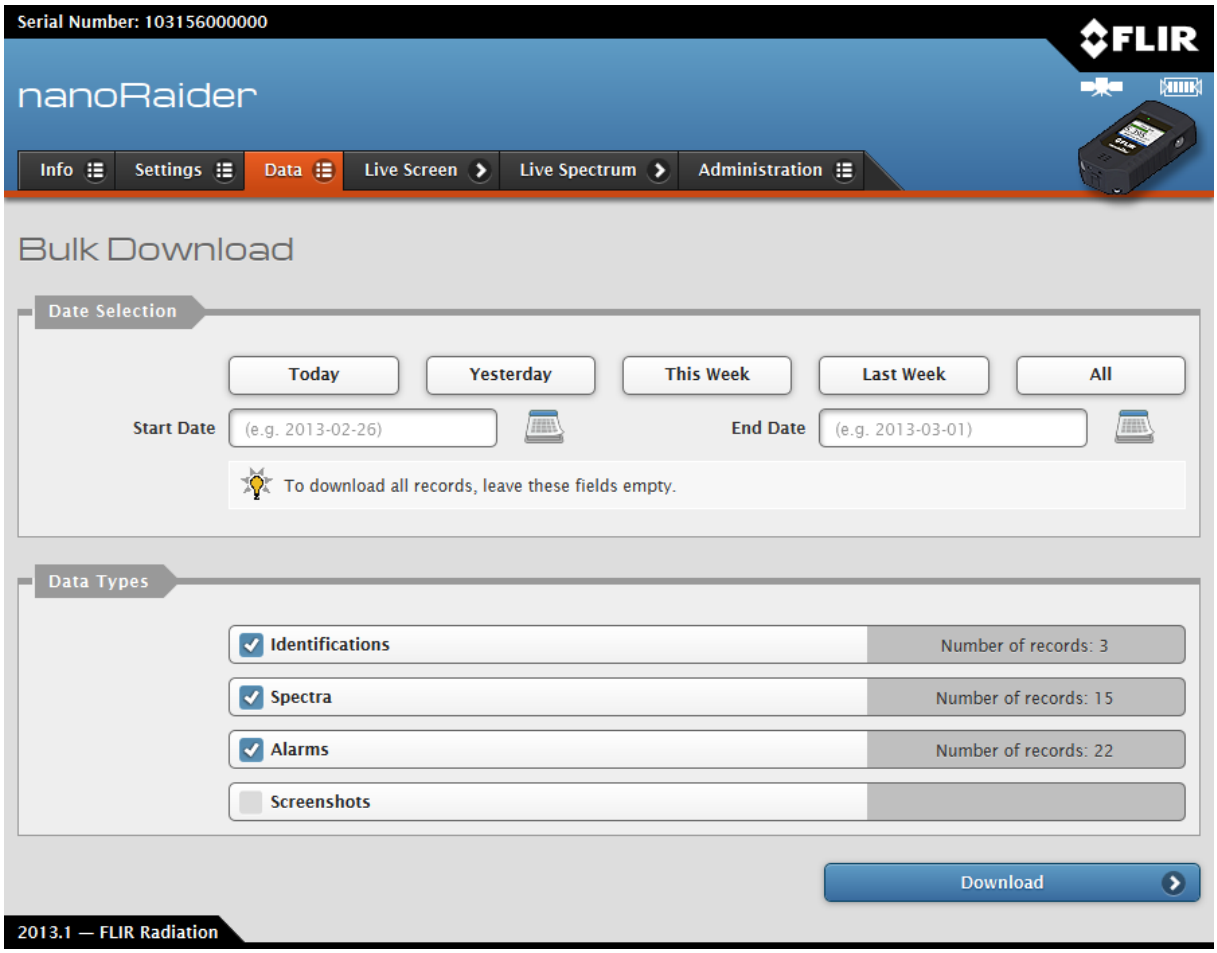

Figure 209. Bulk download web page

After you have checked a box, the number of records matching the data selection criteria is shown.

Download

Initiate the download.

The name of the downloaded `*.zip` archive begins with the serial number of the FLIR identiFINDER R300 followed by the type of contents, for example `103156000000 Bulk Download.zip`

Depending on the configuration of your web browser, the archive will be downloaded to your standard download folder or your browser will ask you to name a destination folder and a file name.

The downloaded archive contains folders for every data type. These folders contain folders for the available file formats of that type. The actual data files have the same names as if they were downloaded individually.

```
103156000000 Bulk Download:
   Alarms:
      Alarms.txt
   Identifications:
      ANSI N42.42 2006:
         Identification 1002.ANSI N42.42 2006.n42
         Identification 1003.ANSI N42.42 2006.n42
      ANSI N42.42 2012:
         Identification 1002.ANSI N42.42 2012.n42
         Identification 1003.ANSI N42.42 2012.n42
      spc:
         Identification 1002.Measurement.spc
         Identification 1003.Measurement.spc
      spe:
         Identification 1002.Measurement.spe
         Identification 1003.Measurement.spe
   Screenshots:
      IdentifyScreen_D20121227_T224932+00_00.png
      DoseRateScreen_D20121227_T224900+00_00.png
   Spectra:
      ANSI N42.42 2006:
         Spectrum 1010.ANSI N42.42 2006.n42
         Spectrum 1014.ANSI N42.42 2006.n42
      ANSI N42.42 2012:
         Spectrum 1010.ANSI N42.42 2012.n42
         Spectrum 1014.ANSI N42.42 2012.n42
      spc:
         Spectrum 1010.Measurement.spc
         Spectrum 1014.Measurement.spc
      spe:
         Spectrum 1010.Measurement.spe
         Spectrum 1014.Measurement.spe
```

8.11 Identifications (Web Page)

Data (p. 180) ➤ Identifications

This web page (Figure 210, p. 200) tabulates the identification results stored in the FLIR identiFINDER R300's database (For the navigation of tables refer to section 2.4.2, p. 55).

The table shows several columns for every record:

Nº The arbitrary reference number of the record.

Saved on

The date and time of storage of the record.

Type

The trigger of the identification measurement.

Manual

You saved the measurement manually (see 4.3, p. 90).

Auto The measurement was triggered by the automated mode (see 4.4, p. 93).

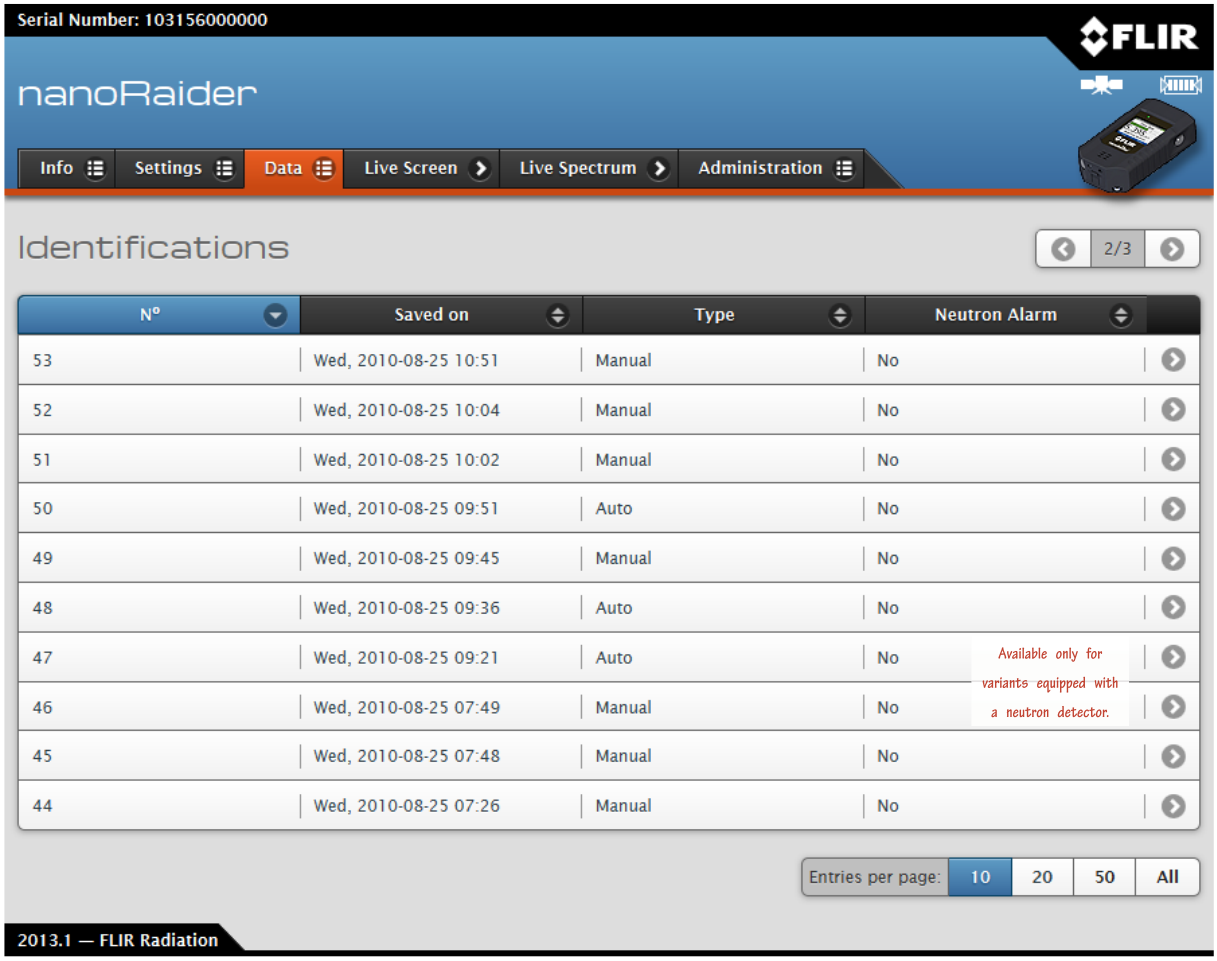

Figure 210. Table of identification result records

Neutron Alarm ♦

Shows whether a neutron alarm was raised during the measurement this identification result is based upon.

♦ Available only for variants equipped with a neutron detector.

Show

Open a page showing details (see 8.11.1, p. 200) of the record.

8.11.1 Identification Details (Web Page)

Details of a single record are shown on an individual page (Figure 211, p. 201) which you can open from the table of records (Figure 210, p. 200) by clicking Show.

For the navigation of records and other common elements of record pages refer to section 2.4.3, p. 56.

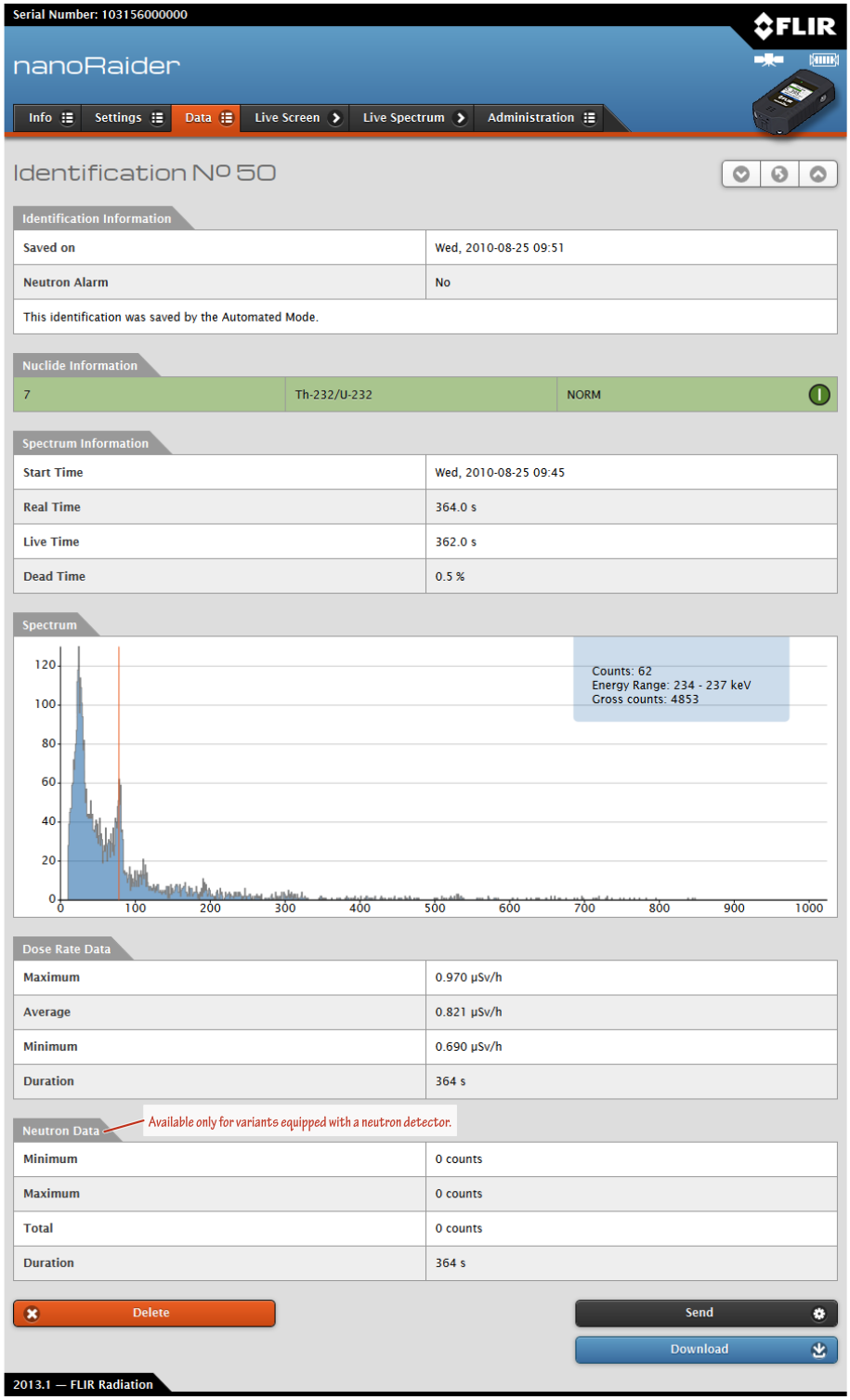

Figure 211. Details of an identification result record

To download the shown record, click Download and follow the directions given by your web browser.

The name of the downloaded `*.zip` archive begins with the serial number of the FLIR identiFINDER R300 followed by the type and the reference number of the record, for example `103156000000 Identification 4711.zip`

The downloaded archive contains files in several formats. The file names comprise the type of data and the reference number of the record.

`Identification 4711.ANSI N42.42 2006.n42`
: An XML file according to ANSI N42.42 2006 (p. 269) containing instrument information, the identification result, and the measured spectrum.

`Identification 4711.ANSI N42.42 2012.n42`
: An XML file according to ANSI N42.42 2012 (p. 269) containing instrument information, the identification result, and the measured spectrum.

`Identification 4711.Measurement.spc`
: A text file containing instrument information, the identification result and the measured spectrum.

`Identification 4711.Measurement.spe`
: A text file containing instrument information, the identification result and the measured spectrum.

8.12 Spectra (Web Page)

Data (p. 180) ➤ Spectra

This web page (Figure 212, p. 203) tabulates the spectra stored in the FLIR identiFINDER R300's database (For the navigation of tables refer to section 2.4.2, p. 55).

The table shows several columns for every record:

N° The arbitrary reference number of the record.

Start Time
: The beginning of data acquisition of the spectrum.

Saved on
: The date and time of storage of the record.

Real Time
: The real time of data acquisition of the spectrum.

Show
: Open a page showing details (see 8.12.1, p. 203) of the record.

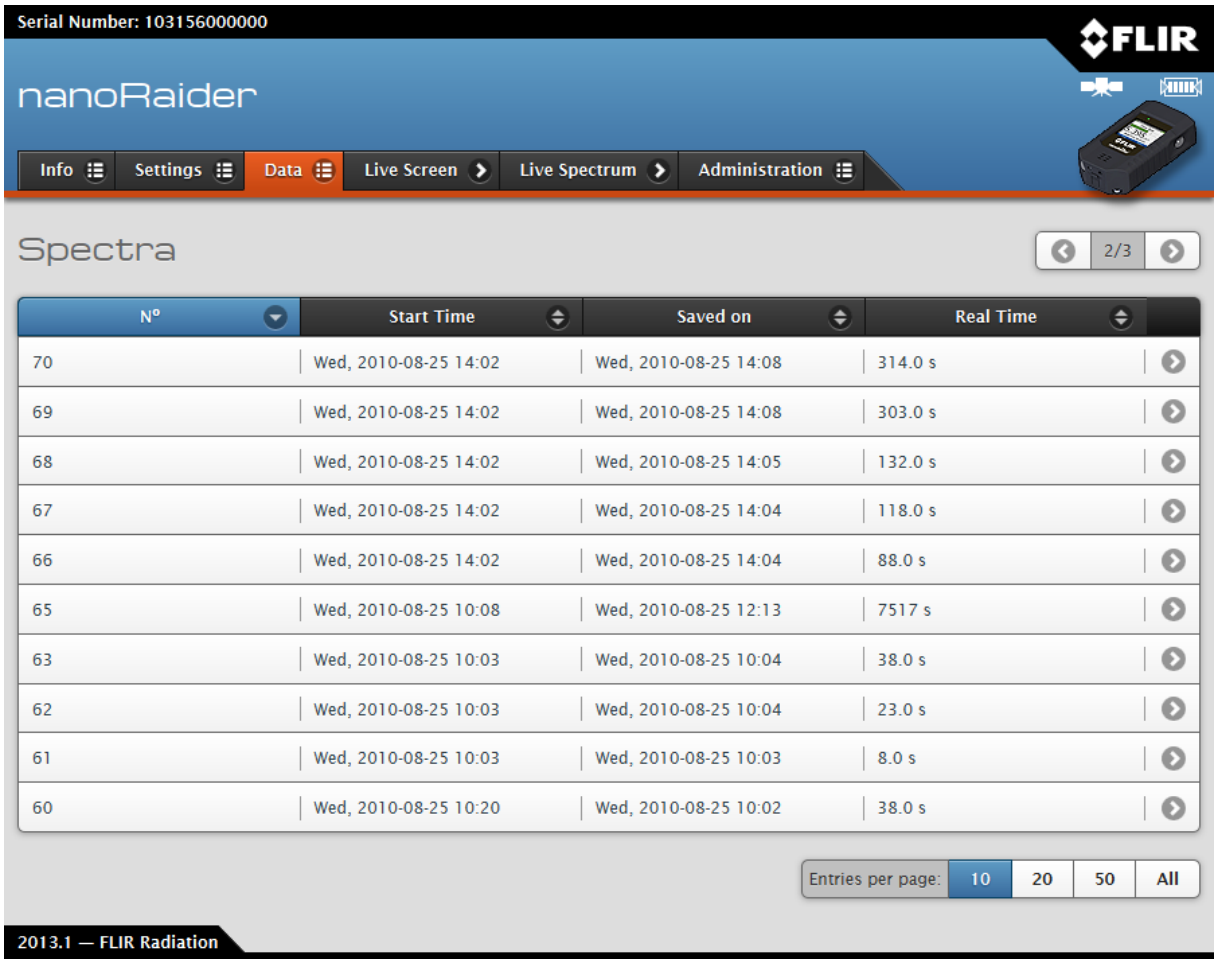

Figure 212. Table of spectrum records

8.12.1 Spectrum Details (Web Page)

Details of a single record are shown on an individual page (Figure 213, p. 205) which you can open from the table of records (Figure 212, p. 203) by clicking Show.

For the navigation of records and other common elements of record pages refer to section 2.4.3, p. 56.

To download the shown record, click Download and follow the directions given by your web browser.

The name of the downloaded `*.zip` archive begins with the serial number of the FLIR identiFINDER R300 followed by the type and the reference number of the record, for example `103156000000 Spectrum 4711.zip`

The downloaded archive contains files in several formats. The file names comprise the type of data and the reference number of the record.

`Spectrum 4711.ANSI N42.42 2006.n42`

An XML file according to ANSI N42.42 2006 (p. 269) containing instrument information and the measured spectrum.

`Spectrum 4711.ANSI N42.42 2012.n42`

An XML file according to ANSI N42.42 2012 (p. 269) containing instrument information and the measured spectrum.

`Spectrum 4711.Measurement.spc`

A text file containing instrument information and the measured spectrum.

`Spectrum 4711.Measurement.spe`

A text file containing instrument information and the measured spectrum.

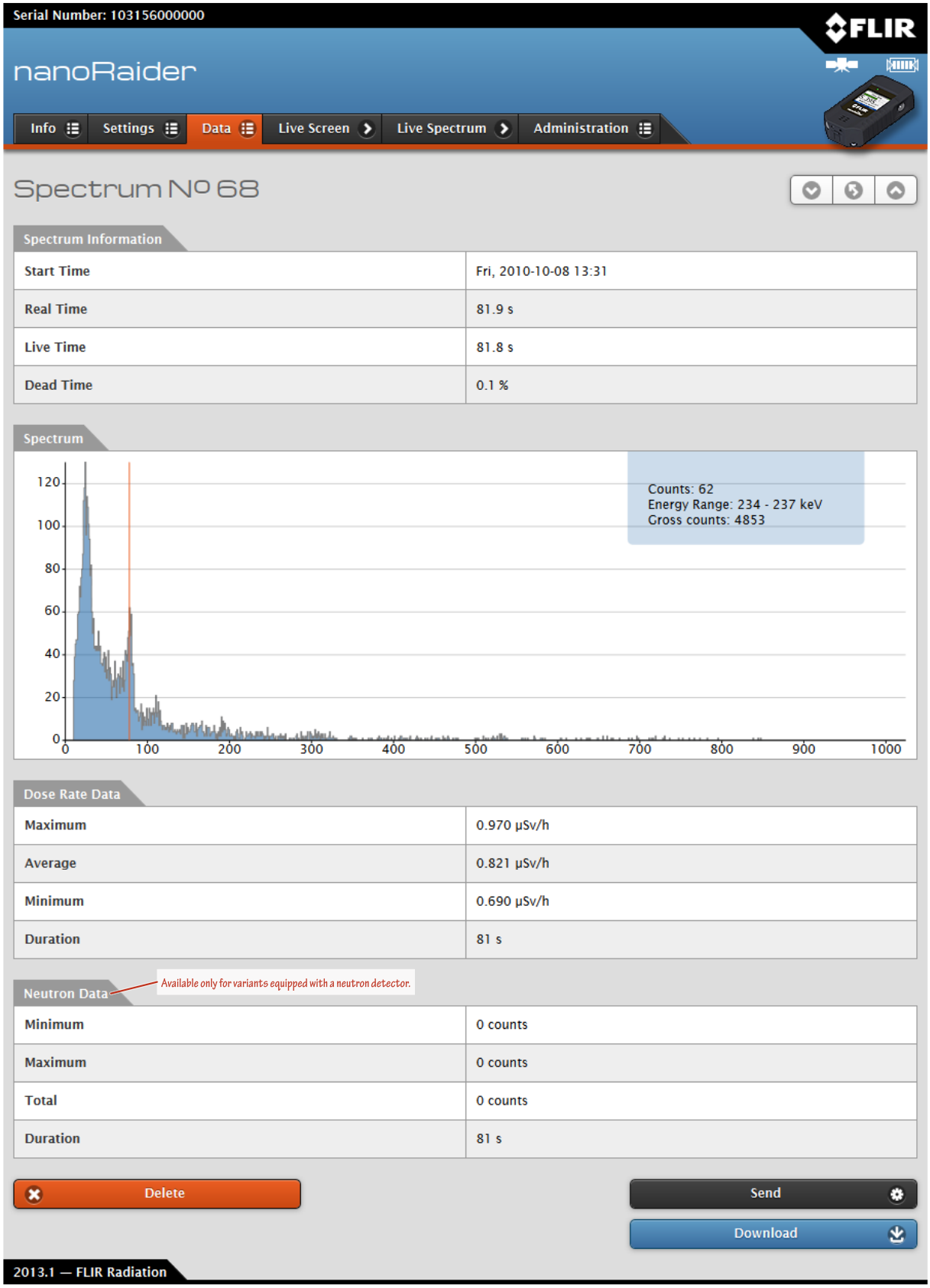

Figure 213. Details of a spectrum record

8.13 Alarms (Web Page)

Data (p. 180) ➤ Alarms

This web page (Figure 214, p. 206) tabulates the alarms and warnings stored in the FLIR identiFINDER R300's database (For the navigation of tables refer to section 2.4.2, p. 55).

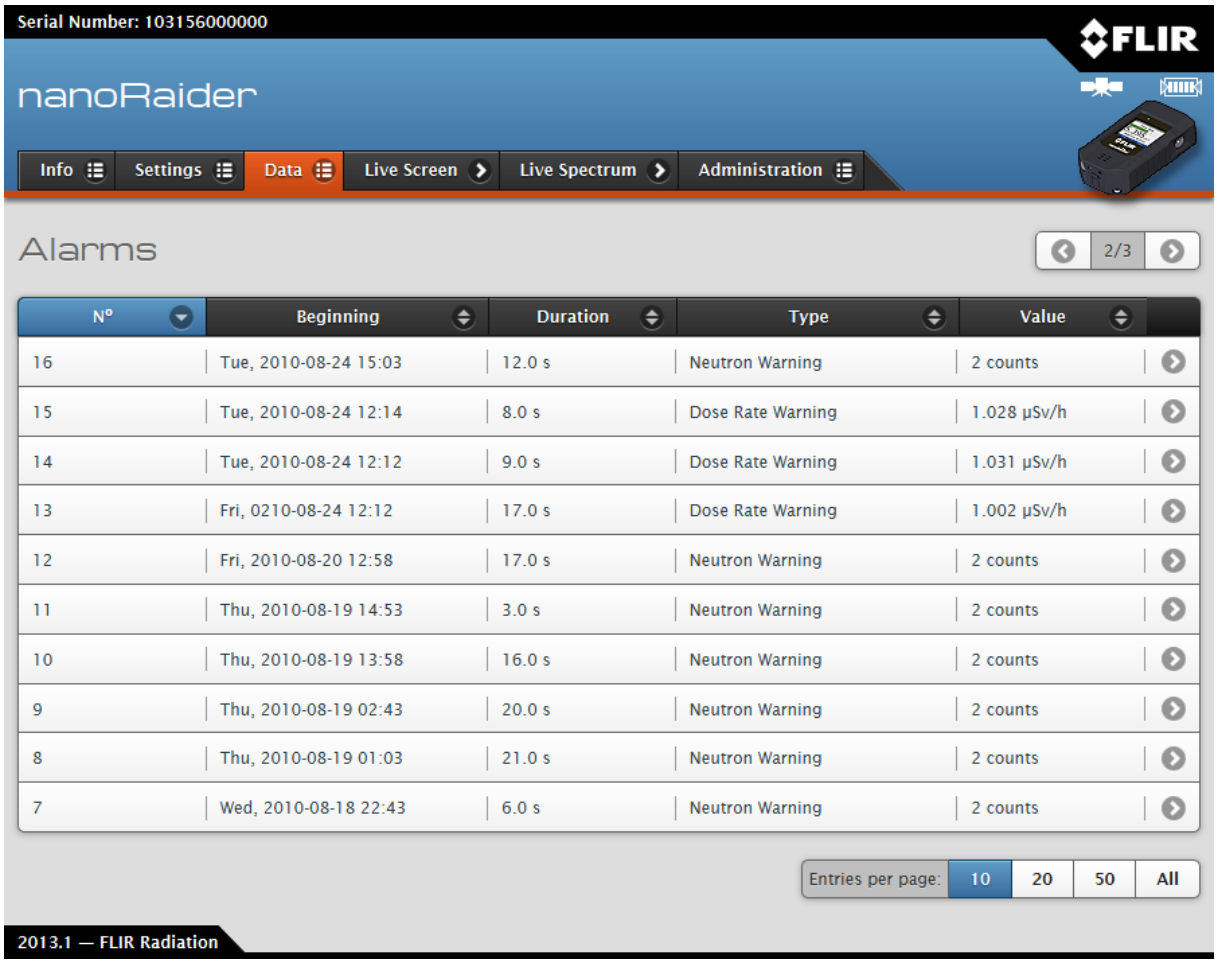
Serial Number: 103156000000
FLIR
nanoRaider
Info
Settings
Data
Live Screen
Live Spectrum
Administration
Alarms
2/3
N°
Beginning
Duration
Type
Value
16 Tue, 2010-08-24 15:03 12.0 s Neutron Warning 2 counts
15 Tue, 2010-08-24 12:14 8.0 s Dose Rate Warning 1.028 µSv/h
14 Tue, 2010-08-24 12:12 9.0 s Dose Rate Warning 1.031 µSv/h
13 Fri, 0210-08-24 12:12 17.0 s Dose Rate Warning 1.002 µSv/h
12 Fri, 2010-08-20 12:58 17.0 s Neutron Warning 2 counts
11 Thu, 2010-08-19 14:53 3.0 s Neutron Warning 2 counts
10 Thu, 2010-08-19 13:58 16.0 s Neutron Warning 2 counts
9 Thu, 2010-08-19 02:43 20.0 s Neutron Warning 2 counts
8 Thu, 2010-08-19 01:03 21.0 s Neutron Warning 2 counts
7 Wed, 2010-08-18 22:43 6.0 s Neutron Warning 2 counts
Entries per page: 10 20 50 All
2013.1 — FLIR Radiation

Figure 214. Table of alarm records

The table shows several columns for every record:

N° The arbitrary reference number of the record.

Beginning

The date and time the alarm was raised.

Duration

The duration of the alarm. If the instrument was switched off during the alarm, the duration is not given.

Type

The type of alarm or warning.

Value

The quantity which increased above the alarm threshold.

Show

Open a page showing details (see 8.13.1, p. 207) of the record.

8.13.1 Alarm Details (Web Page)

Details of a single record are shown on an individual page (Figure 215, p. 207) which you can open from the table of records (Figure 214, p. 206) by clicking Show.

For the navigation of records and other common elements of record pages refer to section 2.4.3, p. 56.

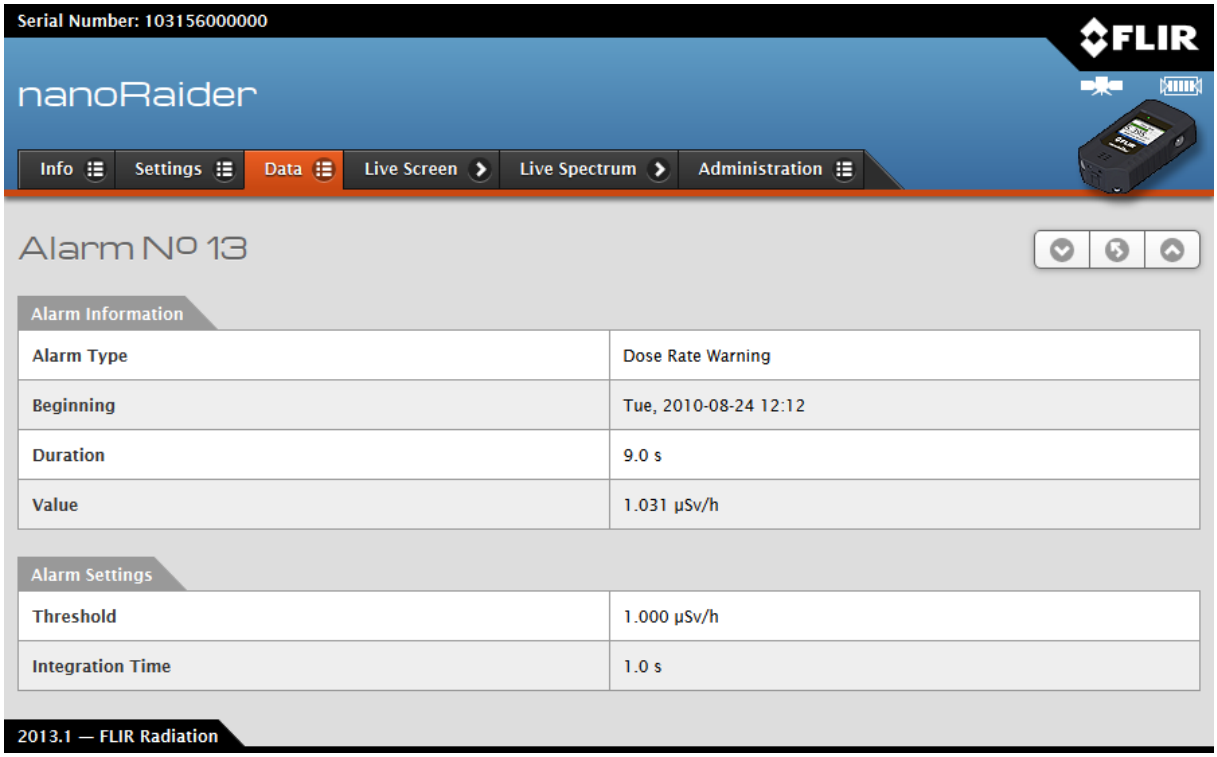

Figure 215. Details of an alarm record

8.14 Screenshots (Web Page)

Data (p. 180) ➤ Screenshots

This web page (Figure 216, p. 208) lists the screenshots saved in the database of the FLIR identiFINDER R300 (see 2.2.8, p. 49, cf 7.2, p. 170).

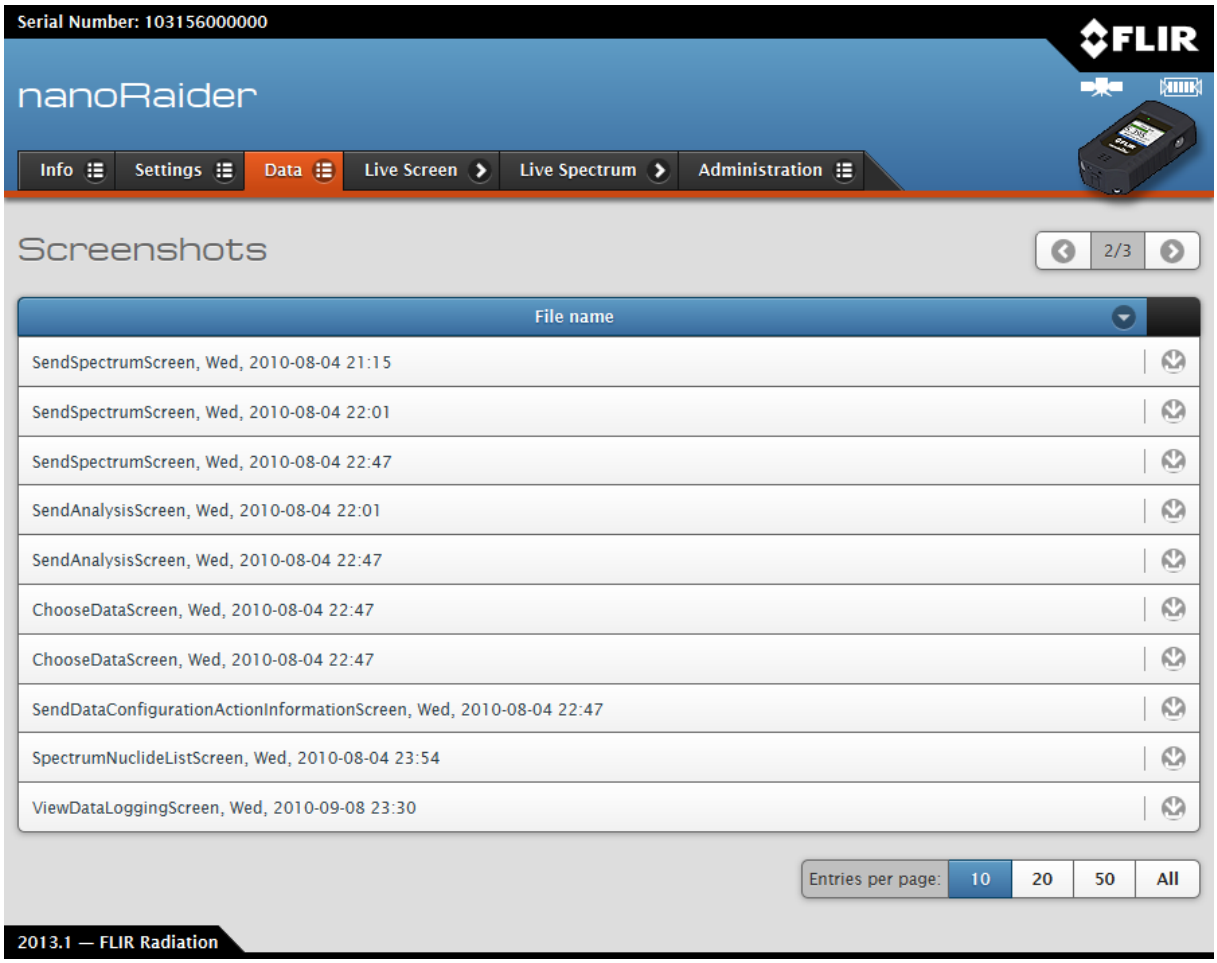

Figure 216. Table of screenshots

After you hold the pointer over the name of a screenshot file for a moment, the screenshot will appear in an overlay.

To download a screenshot file to your computer, click its name and follow the directions given by your web browser.

8.15 Live Screen (Web Page)

Live Screen

This web page reflects the screen of your FLIR identiFINDER R300 (Figure 217, p. 209). The image is updated every 2 seconds.

You can operate your FLIR identiFINDER R300 with the instrument keyboard (see 2.2, p. 32) or by clicking the buttons in the web page image.

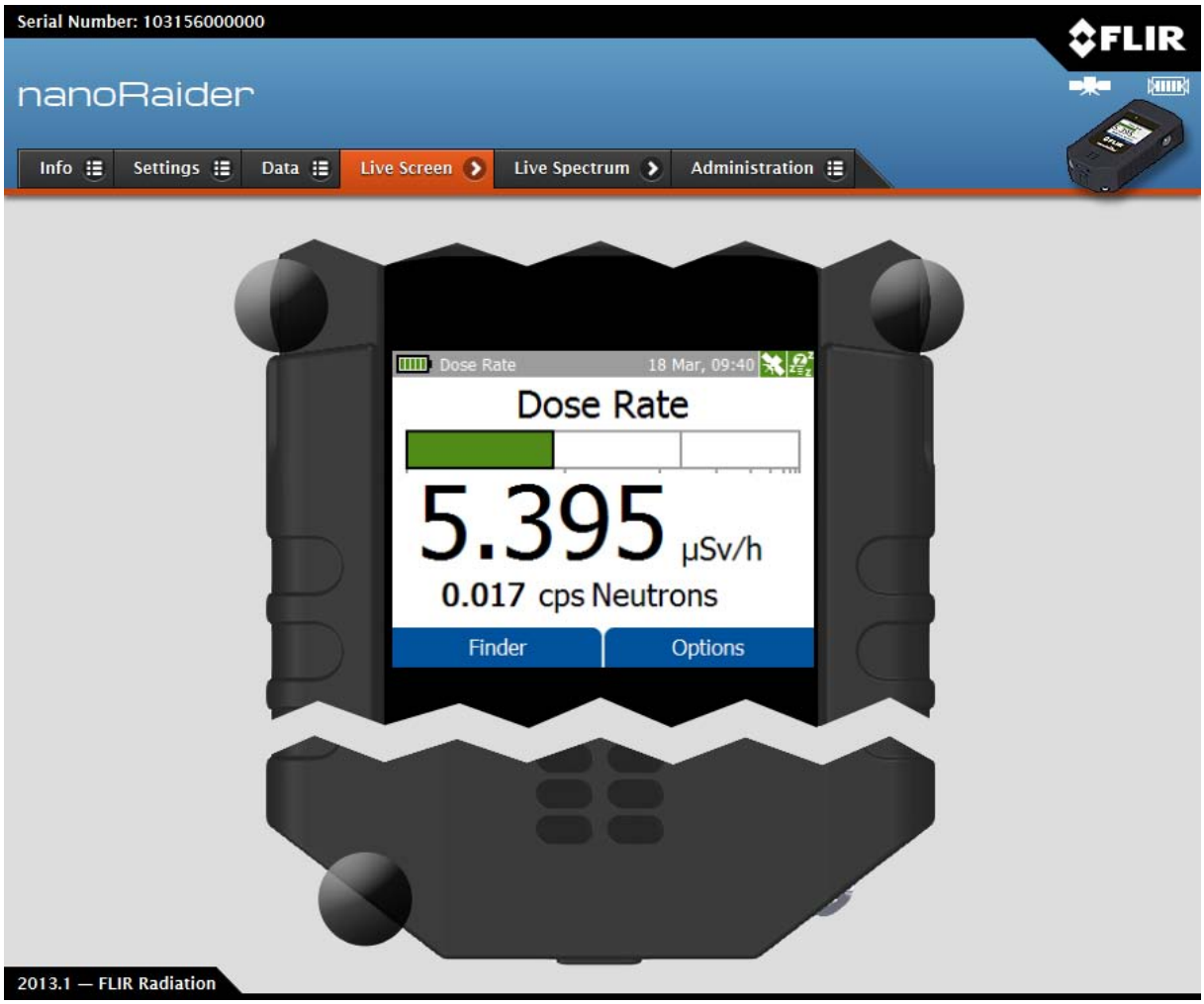

Figure 217. The FLIR identiFINDER R300's screen live in the web interface

Be patient when clicking or pressing buttons. Your actions are recognized but the image is refreshed only every other second.

8.16 Live Spectrum (Web Page)

Live Spectrum

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Spectrum (p. 106)

The main feature of this web page (Figure 218, p. 210) is the live spectrum chart.

The live spectrum shown here is independent from the spectrum you can view on the FLIR identiFINDER R300 (see 6.2, p. 106).

Buttons above the chart provide commands to acquire and manage spectra, buttons below the chart influence the display of the data.

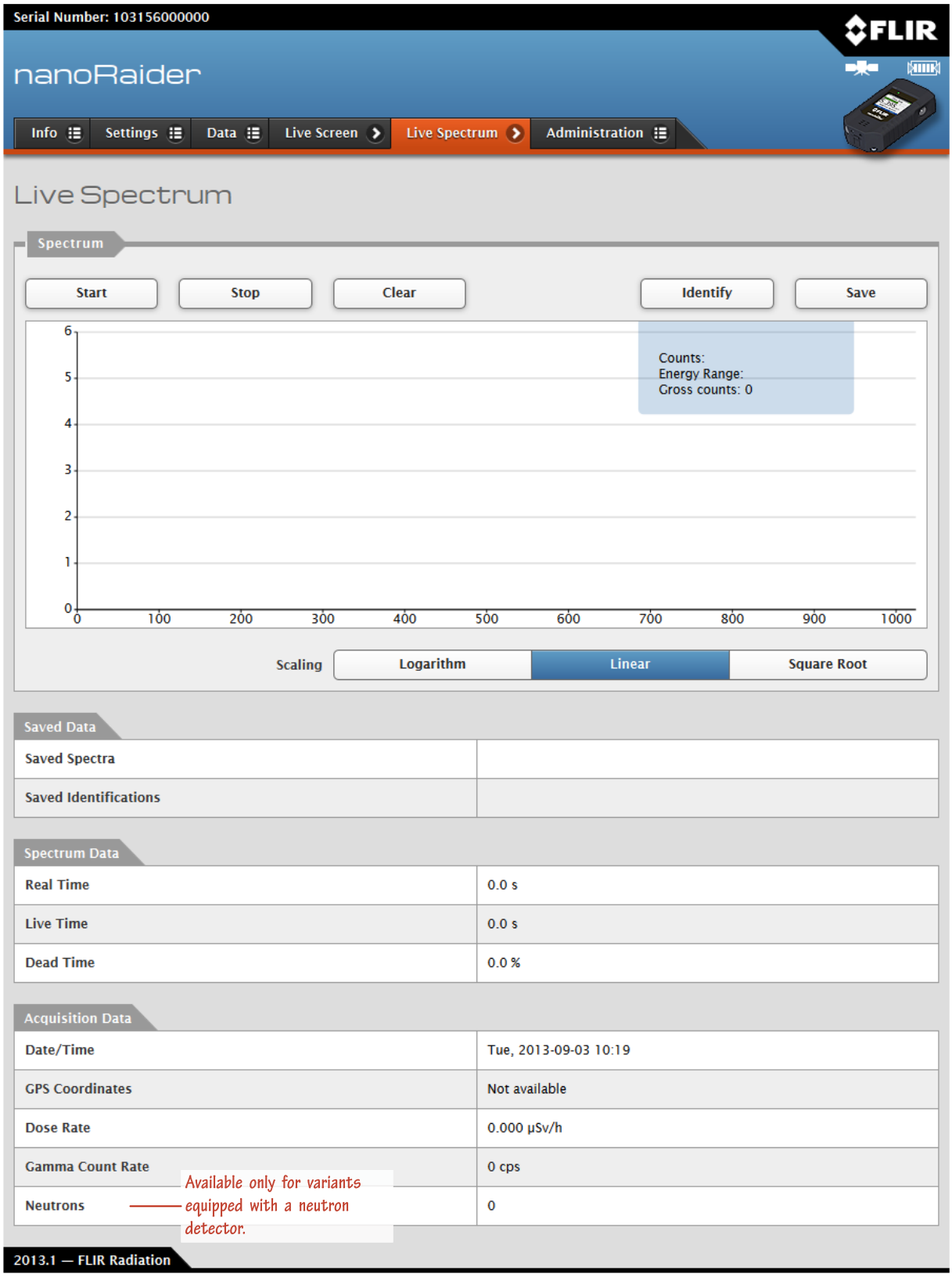

Figure 218. Empty live spectrum page

Start

Starts the acquisition of data.

⚠ The FLIR identiFINDER R300 interrupts other operations during the acquisition. You will be notified on the instrument's screen (see 4.5, p. 95).

The spectrum chart and the information shown below the chart are updated every second (Figure 219, p. 213).

The current spectrum is not cleared before recording data, that is, new measurements are added to the existing spectrum. To record a pristine spectrum, use the Clear command first (see below).

The acquisition of spectrum data does **not** stop if you navigate to another web page or even disconnect the FLIR identiFINDER R300 from the computer. The acquisition of spectrum data stops in one of the following events:

- You end the acquisition with Stop.
- You end the acquisition on the instrument with Stop (see 4.5, p. 95).

We recommend to stop data acquisition before you exit the live spectrum to relieve the FLIR identiFINDER R300 from processing spectrum data.

Stop

Stops the acquisition of data.

Clear

Clears the spectrum.

⚠ This command clears the current spectrum but does not stop the current acquisition of data, if any.

Identify

Applies the identification algorithm to the current spectrum. The result is shown above the chart (Figure 220, p. 214).

The identification result is stored in the FLIR identiFINDER R300's database. The reference numbers of identification results saved during this live spectrum session are shown in a section below the chart.

Save

Saves the current spectrum into the database of the FLIR identiFINDER R300. The reference numbers of spectra saved during this live spectrum session are shown in a section below the chart.

◉ Logarithmic

Switches to logarithmic scaling along the vertical axis of the spectrum chart.

◉ Linear

Switches to linear scaling (the default) along the vertical axis of the spectrum chart.

◉ Square Root

Switches to square root scaling along the vertical axis of the spectrum chart.

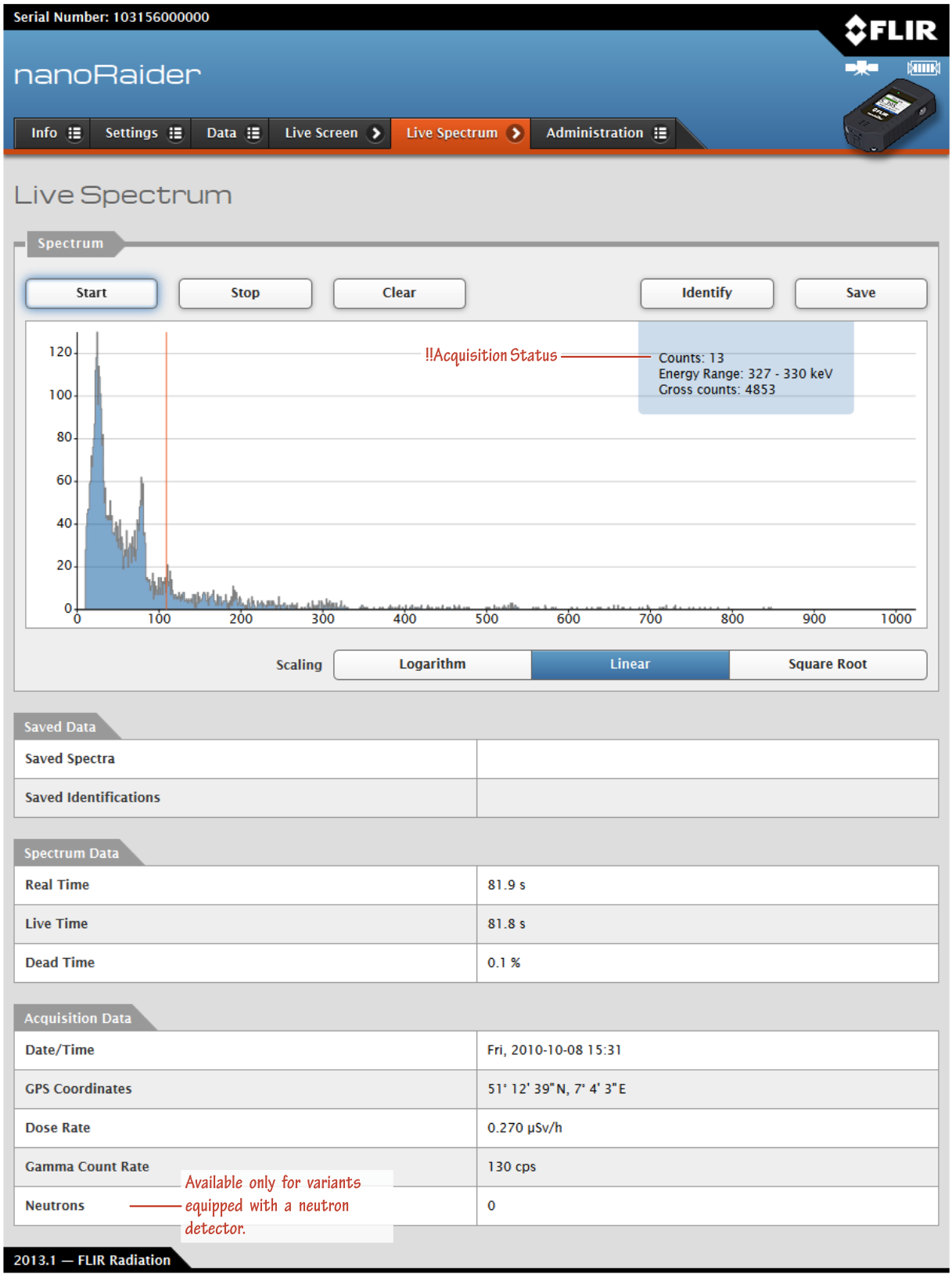

Figure 219. Live spectrum page during data acquisition

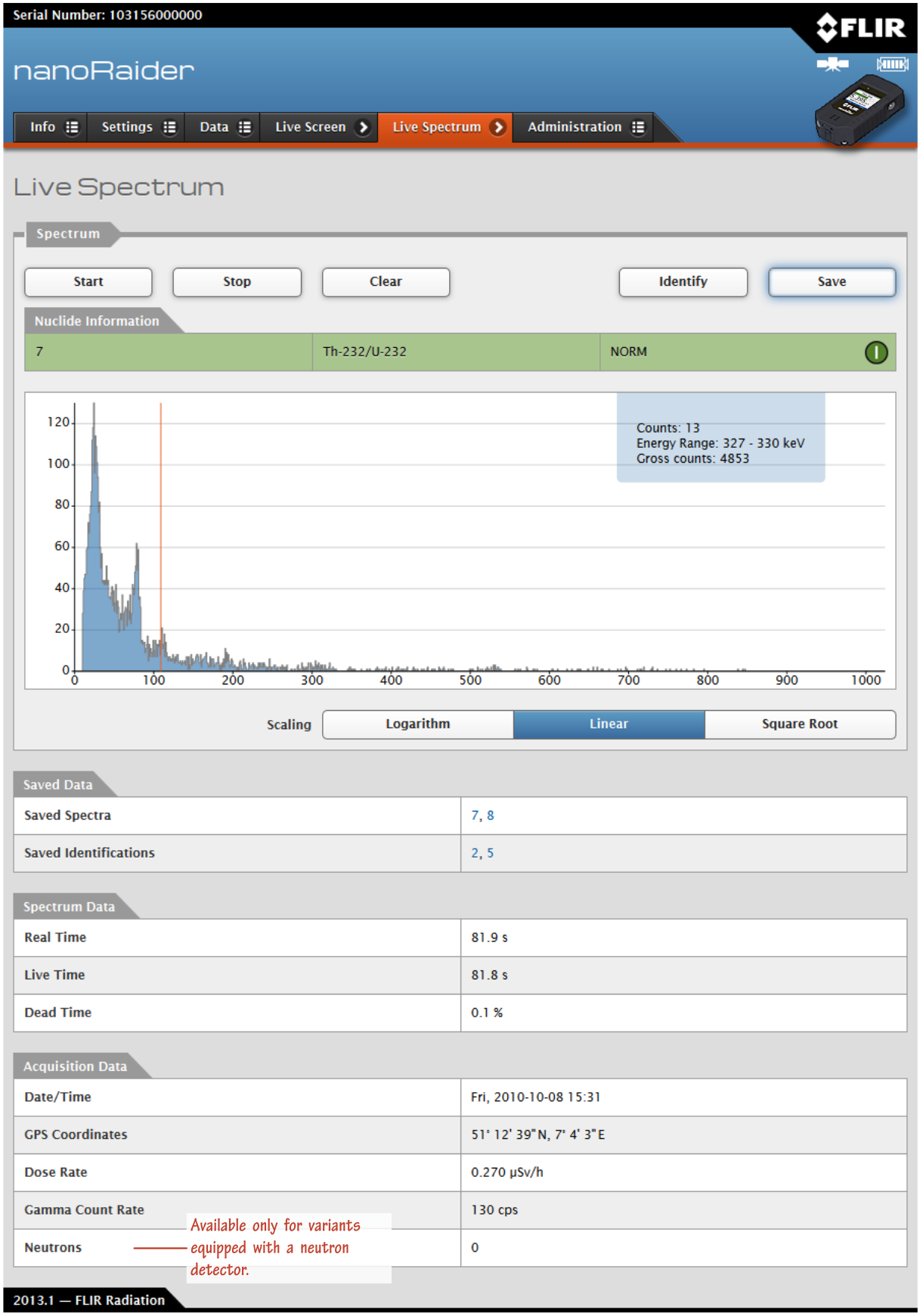

Figure 220. Identification results of a live spectrum

8.17 Software Update (Web Page)

Administration (p. 181) ➤ Software Update

This web page (Figure 221, p. 215) lets you load files onto your FLIR identiFINDER R300 for software updates. The FLIR identiFINDER R300 will recognize the uploaded file and process it as described in B.2, p. 255.

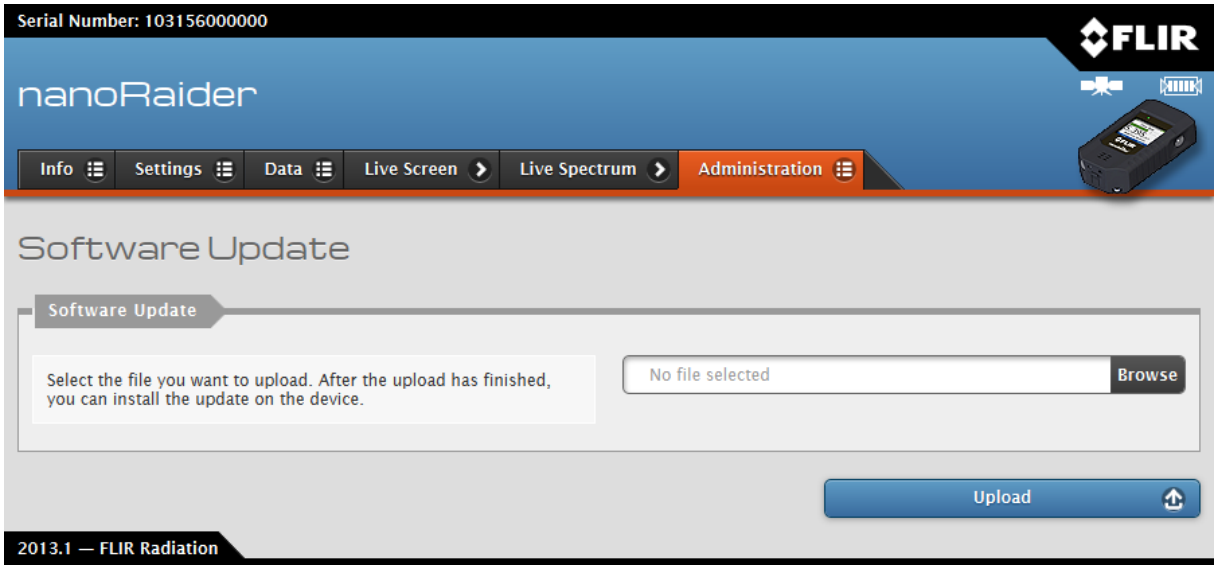

Figure 221. File upload web page

Software Update

Specify the file to be uploaded.

Selected File [...]

Enter the path to the file.

Browse...

Use your computer's standard method to choose a file.

Upload

Upload the file to the FLIR identiFINDER R300.

8.18 Password (Web Page)

Administration (p. 181) ➤ Password

You can change the administrator password (see 2.4.6, p. 60) on this web page (Figure 222, p. 216).

Password of user "x"

Enter the current password for the given user and the new password twice.

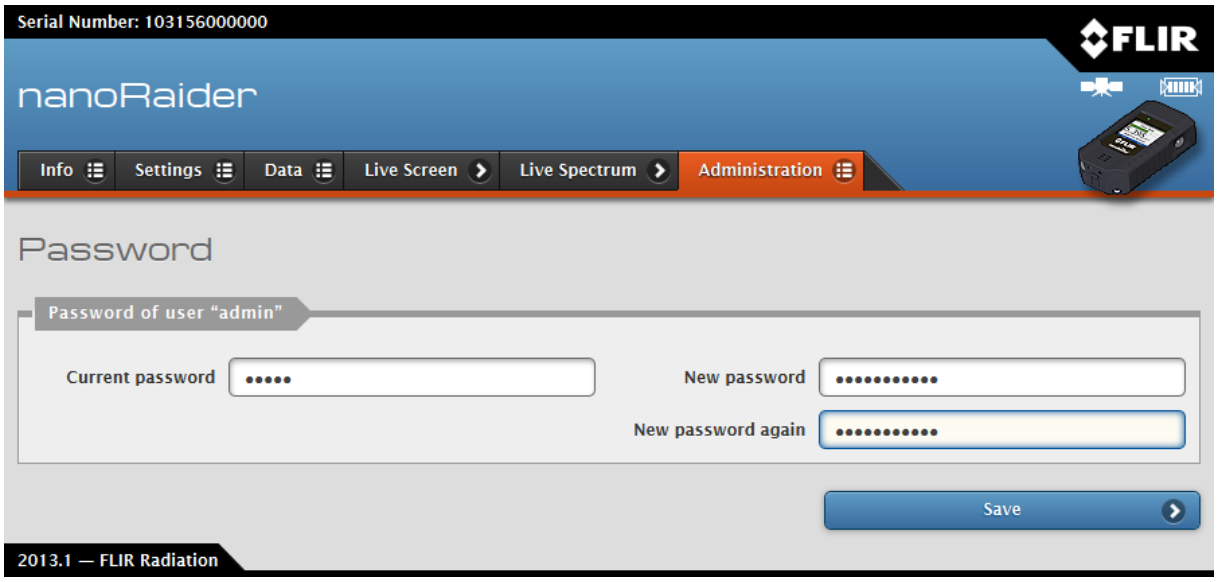

Figure 222. Web page to change the administrator password

Save

Transfer your changes to the FLIR identiFINDER R300.

8.19 System Files (Web Page)

Administration (p. 181) ➤ System Files

This web page (Figure 223, p. 217) lets you download or delete log files from your FLIR identiFINDER R300. These logs are created in certain circumstances and might help our service and support personnel to identify problems.

Available Files

This section (Figure 223, p. 217) lists the available files.

The collection of available files depends on the history of your instrument. Not all of the files shown in Figure 223, p. 217 are always available on all instruments.

Delete

Delete the listed system file from the FLIR identiFINDER R300.

Download

Download the listed system file to your computer.

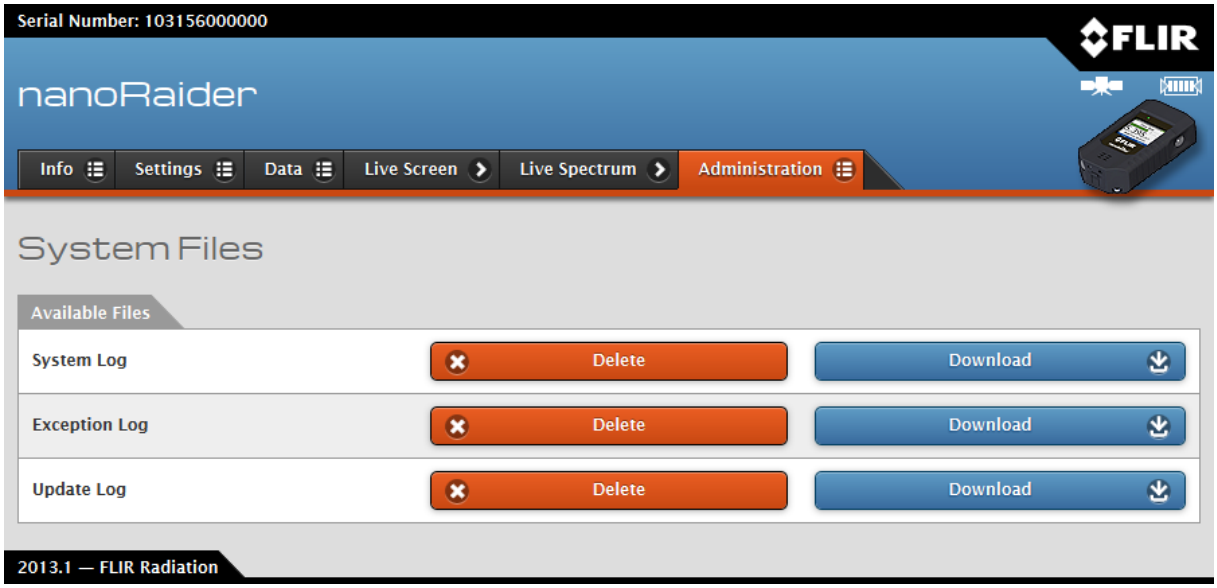

Figure 223. System files web page

Chapter 9

Sending Data to a Remote Server

The FLIR identiFINDER R300 can transfer data via the Internet to a remote server for further processing like reachback analysis, archival or whatever process is implemented on the server, see Figure 224, p. 219 for a possible scenario.

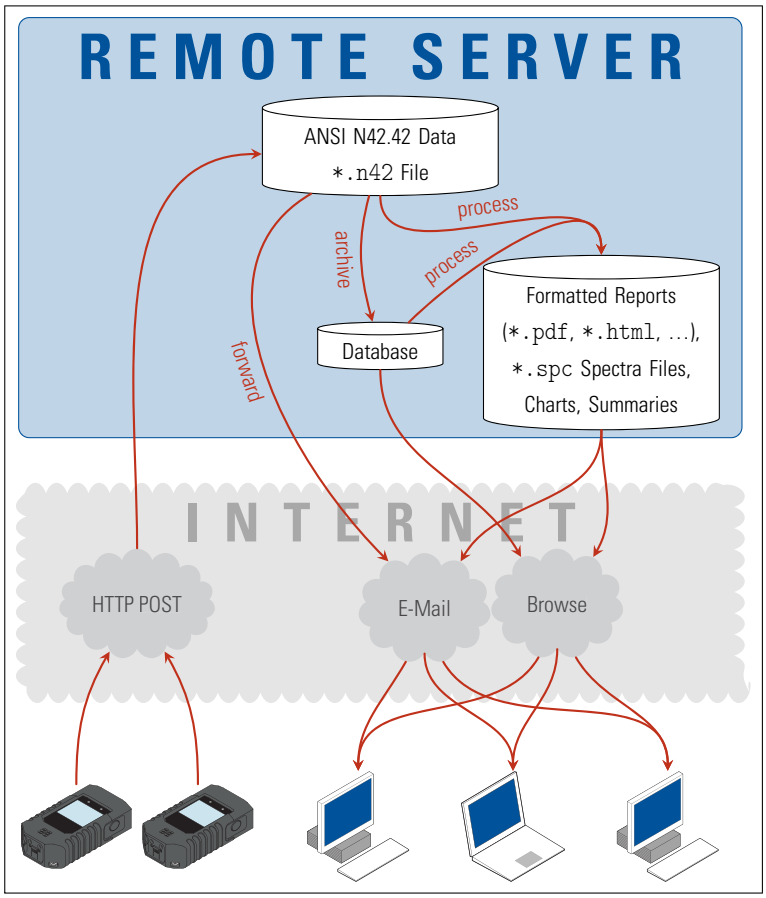

Figure 224. A possible scenario for remote handling of FLIR identiFINDER R300 data

The FLIR identiFINDER R300 uploads data in a file formatted according to ANSI N42.42 2006 (p. 269) via a standard HTTP POST command, so all a server has to do is to process this file. You can develop your own server software (ask us (see B.4, p. 257) for the technical details and a reference example) or have us build server software tailored to your needs.

The HTTP URI (e.g. `http://n42.example.com/reachback`) of the remote server running the software to accept and handle the data sent by the FLIR identiFINDER R300 has to be stored in the instrument's settings under

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Remote Server Settings (p. 149)

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Remote Server (p. 192)

The protocol (`http`) is part of the URI, that is, you can change it to `https` for secure transfer if required.

`https` connections require a trusted SSL certificate on the server.

Protocols other than `http` or `https` are not supported.

The FLIR identiFINDER R300 will transfer data to this address with a `HTTP POST` command using these parameters:

`serialnumber`
: The serial number of the FLIR identiFINDER R300

`reachbackfile`
: The ANSI N42.42-formatted data file

To check the file contents locally, you can download a file with the same contents via the web interface (see 8, p. 179).

To verify proper reception of the data sent, the instrument checks for a success message (a `X-ReachbackSuccess` HTTP header) or an error message (a `X-ReachbackError` HTTP header with the error message as the header's value).

In case of an error, the FLIR identiFINDER R300 shows this message on the screen.

9.1 Internet Connection

You can connect the FLIR identiFINDER R300 to the Internet via a computer already connected (see 8, p. 179) or by tethering your cell phone to the FLIR identiFINDER R300 (Figure 225, p. 221), which is possible if

- your cell phone supports Dial-Up Networking (DUN) via Bluetooth,

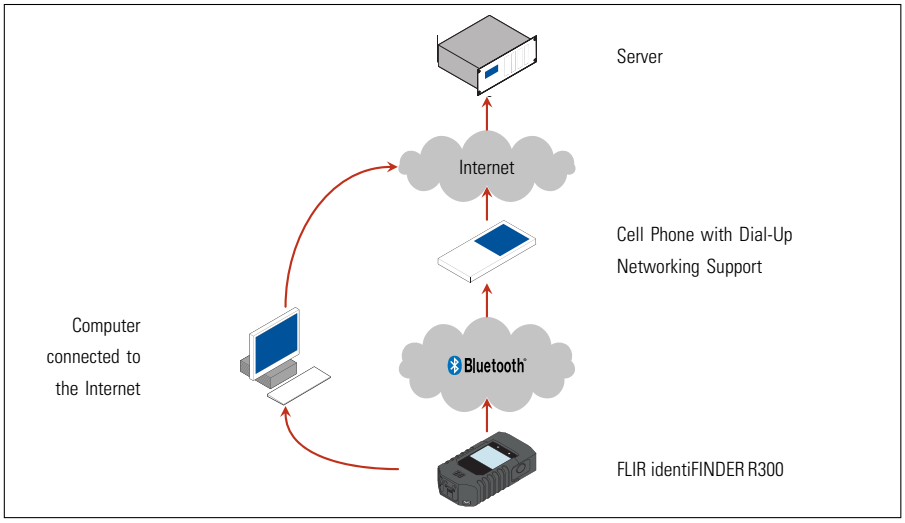

Figure 225. Connection for uploading FLIR identiFINDER R300 data to a remote server

- your phone carrier provides the necessary infrastructure and data plan.

To set up the connection you need the correct credentials and access information **provided by your cell phone carrier**, in particular

User Name

The user name and

Password

the password for the dial up connection. Both can be omitted with some carriers which use other means for authentication, for example your SIM card.

Connection String

Settings specifying the connection, for example

`+CGDCONT=1,"IP","web.example.com"`.

Phone Number

The number for data connections, for example `*99***1#`.

➔ **To configure your FLIR identiFINDER R300 for sending data to a remote server**...

These steps are required once for a given combination of cell phone carrier and remote server.

1. Collect the required setup information (see above) from your cell phone carrier or your IT administrator.
2. Enter the setup information into the FLIR identiFINDER R300 (see 6.24, p. 149)
3. Enter the operator's (your) name and voice phone in the FLIR identiFINDER R300 (see 6.27, p. 153) so they can be included in reports to be sent.

Entering these values is much more convenient via the web interface (see 8, p. 179).

➔ **To prepare for sending data**…

These steps are required before actually sending data for the first time after you switch on your FLIR identiFINDER R300.

1. Place you cell phone in the vicinity of your FLIR identiFINDER R300.
2. Pair your cell phone with the FLIR identiFINDER R300 (see 6.23.3, p. 144).

All the settings mentioned above are necessary to send data to a remote server. If any item is missing, you will be prompted to enter it when you actually want to send data.

Chapter 10

Connecting via Satellite Phone

The FLIR identiFINDER R300 can also transmit data using a Bluetooth™ DUN connection with a satellite phone. In order to utilize this method of transport, the FLIR identiFINDER R300 must be paired to a Bluetooth-to-Serial converter that is connected to the satellite phone and configured to properly connect to the phone and a reachback server.

10.1 Pairing the FLIR identiFINDER R300 to a Satellite Phone

Currently, the Iridium™ 9505A satellite phone with Iridium data adapter and Parani SD1000 Bluetooth-to-Serial adapter have been verified with the FLIR identiFINDER R300 but other satellite phones and adapters may also work. Contact our service department for more information.

➔ **To pair with the satellite phone**...

1. Connect the Parani SD1000 Bluetooth-to-Serial adapter connected to the Iridium 9505A satellite phone.
2. Using a pin, press and hold the adapter's recessed Pairing button for two seconds then release. While the LED is flashing in a triple flash pattern, the adapter is discoverable.
3. Place the device in the vicinity of the FLIR identiFINDER R300. The maximum range is 10 m (33 ft) but could be less depending on the environment.
4. From Dose Rate mode on the FLIR identiFINDER R300, press the right button to access the Options menu then navigate to Bluetooth Periphery and select it:

   Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Bluetooth Periphery

   Note: If the "SPP Enabled" screen appears then you must first disable Bluetooth SPP mode at:

   Options Menu (p. 103) ➤ More Options (p. 103) ➤ Bluetooth SPP (p. 104) ➤ Bluetooth SPP Status (p. 141) ➤ Bluetooth SPP Settings

   Once Bluetooth SPP is disabled (if necessary), return to Bluetooth Periphery using the first part of this step before continuing.

5. If the FLIR identiFINDER R300 has not yet been paired with any Bluetooth device, it will begin the search immediately so continue to the next step. If the FLIR identiFINDER R300 has previously been paired with another device, then the Bluetooth device selection screen will appear (Figure 226, p. 224). Select Change device then select Search from the next screen (Figure 227, p. 224) to initiate a search for discoverable Bluetooth devices.

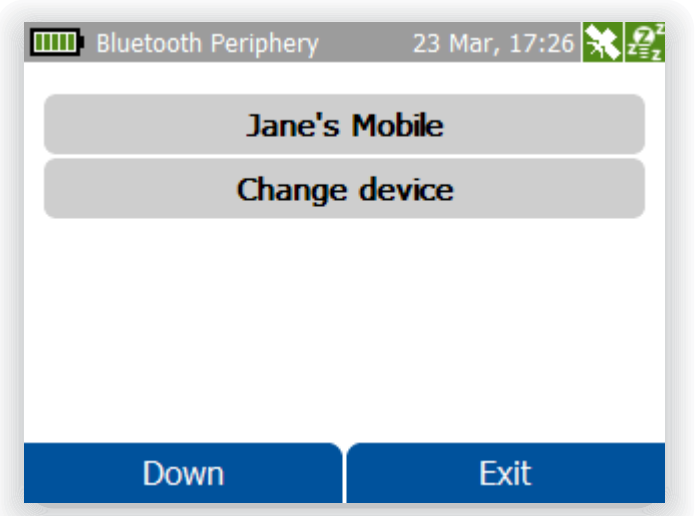

Figure 226. Select "Change Device" if an unwanted device is paired

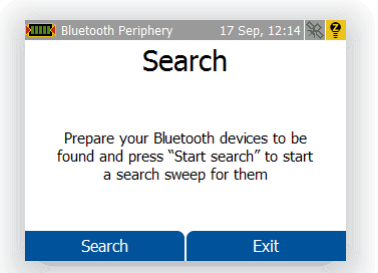
Bluetooth Periphery
17 Sep, 12:14
Search
Prepare your Bluetooth devices to be found and press "Start search" to start a search sweep for them
Search
Exit

Figure 227. "Prepare your Bluetooth devices..." appears after selecting "Change device"

6. Wait a few moments while the FLIR identiFINDER R300 searches for Bluetooth devices supporting the required protocol (Figure 228, p. 224).

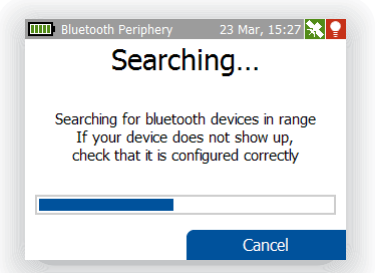

Figure 228. Searching for Bluetooth devices

⚠ If the FLIR identiFINDER R300 is unable to detect any compatible Bluetooth devices it will report "Search Failed" (Figure 228, p. 224). Ensure the SD1000 LED is still flashing in a triple flash pattern and that the devices are within the maximum range. If the devices are more than a few meters apart then move them closer, if possible. Select Search to restart the search for discoverable Bluetooth devices and repeat this step.

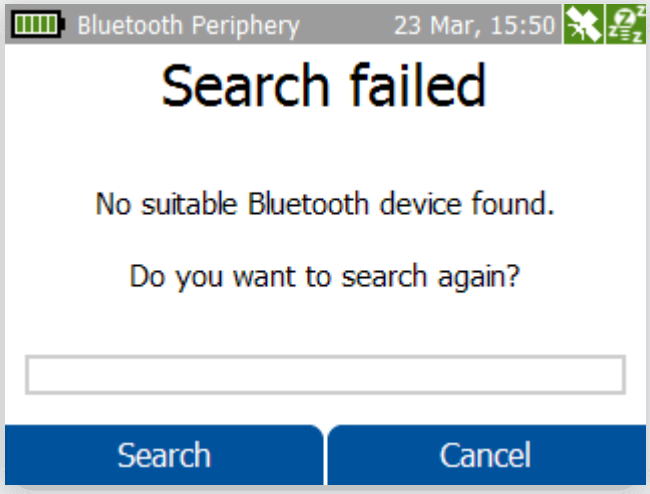

Figure 229. No Bluetooth devices detected

7. Once the Search completes with at least one compatible Bluetooth device selected it will report the identification screen of all detected devices (Figure 230, p. 225). Choose the SD1000... device from the list (Figure 230, p. 225) with Down then press Select to pair.

The device names are listed exactly as received from the detected devices and the name of the SD1000 may differ from what is shown in the screenshot.

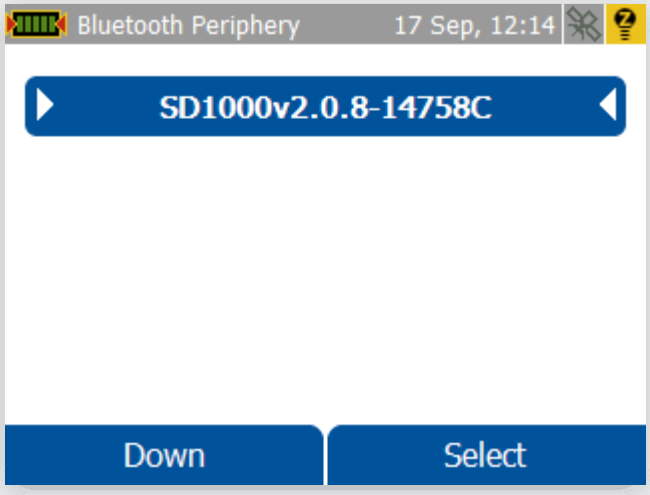

Figure 230. Detected SD1000 device entry chosen

8. Choose the Choose 1234 PIN option (Figure 231, p. 226) then press Select to pair.

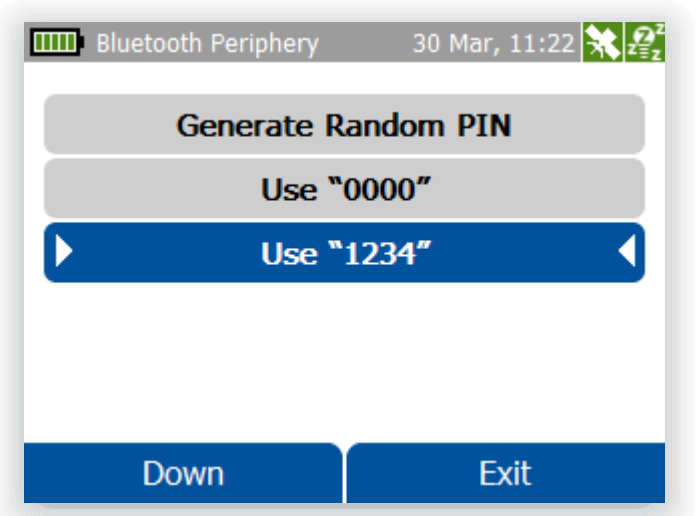

Figure 231. Selecting a PIN for the pairing of Bluetooth devices

9. An information screen (Figure 232, p. 226) will be shown for a short time while pairing is in progress.

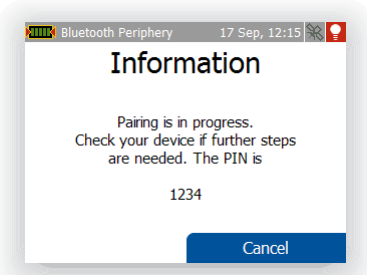

Figure 232. Bluetooth Periphery Information: Pairing is in progress...

⚠ If pairing fails then an error message (Figure 233, p. 226) will be displayed. Make sure the satellite phone and SD1000 are powered on, correctly configured, and still within range of the FLIR identiFINDER R300, then try again.

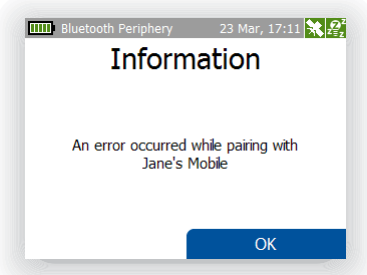

Figure 233. Pairing to a Bluetooth device failed

10. After a successful pairing, the FLIR identiFINDER R300 will display information about the paired Bluetooth device in the Device Details screen (Figure 234, p. 227). Verify that the FLIR identiFINDER R300 has established the Connection as "Dial-Up Network" as shown in

this screen then select Exit. The FLIR identiFINDER R300 is now connected to the satellite phone via the paired SD1000.

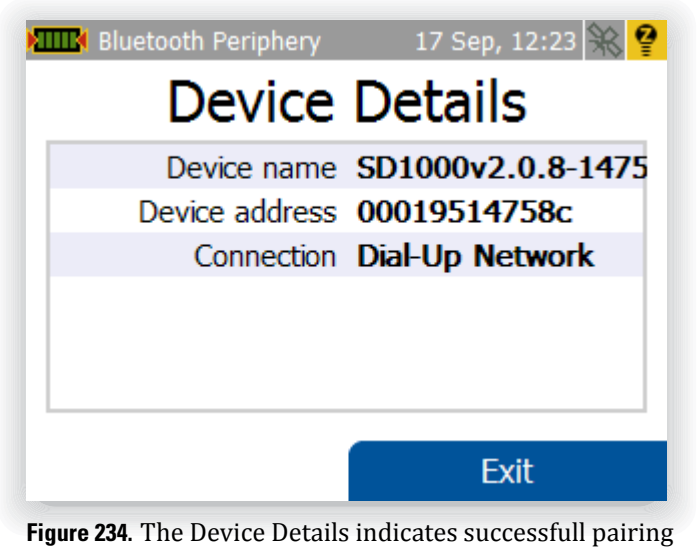

Figure 234. The Device Details indicates successfull pairing

Keep the satellite phone (and SD1000) and the FLIR identiFINDER R300 within 10 m (33 ft) of each other during use. In some environments, the devices may need to be kept even closer than this limit to maintain the pairing.

10.2 Configuring Remote Server Settings for the Satellite Phone

Although the previous section connected the FLIR identiFINDER R300 to the satellite phone, settings must still be established for accessing the satellite phone and the reachback server. These settings are in the Remote Server Settings and may be established on the instrument directly (see 6.24, p. 149) or, more efficiently, through the web interface (see 8.6.2, p. 192).

Options Menu (p. 103) ➤ More Options (p. 103) ➤ Advanced Options (p. 104) ➤ Connectivity Options (p. 104) ➤ Remote Server Settings (p. 149)

Settings (p. 180) ➤ Connectivity (p. 190) ➤ Remote Server (p. 192)

User Name:

`directinternet`

Password:

`directinternet`

Connection String:

Connection string for satellite phone service provider

Phone Number:

DUN Access Number for the satellite phone (from the service provider)

HTTP URI:

URI (web address) of a reachback server

The protocol (`http`) is part of the URI, that is, you can change it to `https` for secure transfer if required.

`https` connections require a trusted SSL certificate on the server.

Protocols other than `http` or `https` are not supported.

Chapter 11

Powering the FLIR identiFINDER R300

The FLIR identiFINDER R300 comes with a rechargeable battery as internal power source which can be replaced only by our service (B.4, p. 257).

11.1 External Power Sources

You can connect the FLIR identiFINDER R300 to external power sources via the Mini-USB-B connector (Figure 5, p. 26), for example to a

- wall mounted power supply (use the Mini-USB-B to USB-A cable included with the FLIR identiFINDER R300, Figure 1, p. 21)
- USB port of a computer (use the Mini-USB-B to USB-A cable included with the FLIR identiFINDER R300, Figure 1, p. 21)
- car adapter (use the Mini-USB-B to USB-A cable included with the FLIR identiFINDER R300, Figure 1, p. 21)

⚠ Please refer to section 7.1, p. 168 for information about plugging and unplugging cables.

The FLIR identiFINDER R300 draws a current of approximately 400 mA. Before connecting to a computer, please make sure the USB outlet of the computer complies with this requirement. This might not be the case with some laptops, netbooks or similar battery powered devices.

While the FLIR identiFINDER R300 is connected to an external power source, the green LED (Figure 5, p. 26) is on. You can run the instrument from external power and charge the batteries.

Compared to a USB power source, charging the FLIR identiFINDER R300 is a lot faster when you use the power supply of the FLIR identiFINDER R300 because it supplies a much higher current than a host conforming to the USB standard.

11.1.1 Wall Mounted Power Supply

The power supply can handle common international AC voltages and frequencies. It features a swappable adaptor for various international receptacles (Figure 235, p. 230, Figure 236, p. 230)

Figure 235. Power Supply: Removing the international adapter

Figure 236. Power Supply: Attaching an international adapter

11.2 Charging the FLIR identiFINDER R300

You can charge the built-in battery by connecting the FLIR identiFINDER R300 to an external power source.

➔ **To charge the batteries in the FLIR identiFINDER R300**...

1. Use the power supply to connect the FLIR identiFINDER R300 to a wall outlet or equivalent power source.

or Use the auto adapter to connect the FLIR identiFINDER R300 to an appropriate power source.

or Connect the FLIR identiFINDER R300 to a computer.

Charging is a lot faster when you use the power supply of the FLIR identiFINDER R300 because it supplies a much higher current than a host conforming to the USB standard.

2. Observe the power indicator (see 2.1, p. 29) if the FLIR identiFINDER R300 is running while charging.

11.2.1 Charging Durations

Shortest charging durations are achieved with

- the FLIR identiFINDER R300 switched off and
- the FLIR identiFINDER R300 connected to the wall mounted power supply shipped with the FLIR identiFINDER R300.

Under these conditions, charging takes about 3 hours.

We recommend leaving the power supply connected for a longer time, for example over night, if circumstances allow.

Charging the batteries will take longer, if

- the FLIR identiFINDER R300 is switched on, or
- the FLIR identiFINDER R300 is powered by a USB-connected computer because the power supply of the FLIR identiFINDER R300 supplies a much higher current than a host conforming to the USB standard.

If the batteries are completely discharged, we recommend to charge them while the FLIR identiFINDER R300 is switched off. Wait at least 15 min after connecting the power adapter before you switch on the instrument.

When reliable batteries with higher capacity become available, we will build them into our products. This will increase the run time and also the charging duration.

11.3 Battery Power Saving Tips

In order to prolong the runtime of the FLIR identiFINDER R300's batteries, you can avoid certain operations or optimize some settings for reduced power consumption.

This section lists those features of your FLIR identiFINDER R300 that need a lot of energy **but** might not be necessary all the time or for all fields of application.

The list begins with the more energy-demanding features and proceeds to the frugal ones.

Backlight Brightness and Timeout

The backlight of the screen draws a significant amount of power. Reduce the backlight brightness (see 6.9, p. 122) to what you really need in your environment.

Let the backlight time out after the shortest period of inactivity (see 6.9, p. 122) convenient for your workflow.

A status icon on the screen keeps you posted about the current energy saving options (see 2.1, p. 30).

GPS Receiver

Switch off the GPS receiver (see 6.11, p. 127) if you don't need coordinates to be saved with, for example, identification results or spectra.

Switch off the GPS receiver while you work at places with poor or no GPS reception (inside buildings, in mines, etc.).

Communication via Bluetooth

Send data to remote servers (see 9, p. 219) only when necessary.

The Bluetooth hardware draws power only while you communicate with remote servers. You don't have to explicitly switch it off.

Finder Mode

Return to the Dose Rate Mode from the Finder Mode when you don't need it anymore (see 4.2, p. 88).

Spectrum Acquisition

Stop the data acquisition for spectra (see 6.2, p. 106) when you don't need it anymore.

Other functions draw extra power as well, but are irrelevant in this context. The web server, for example, is active only while the FLIR identiFINDER R300 is connected to an external power source anyway.

Chapter 12

Accessories for the FLIR identiFINDER R300

This chapter gives an overview of the various accessories available for the FLIR identiFINDER R300; some are included with certain variants, others are sold separately.

12.1 Source Set

The source set (sold separately) is a collection of radiation sources for calibration, testing or training purposes.

Figure 237. Source set (sold separately)

Source sets are available in the variants shown in the table below, each set comprising 8 plastic disks containing radionuclides bonded as chloride.

	Nuclide	Activity [Bq]	Peaks of Interest [MeV]				
RSS8							
1	^{133}Ba	37000	0.081	0.276	0.303	0.356	0.384
2	^{152}Eu	37000	0.121	0.244	0.344	0.562	0.826
			0.963	1.082	1.109	1.408	
3	^{137}Cs	37000	0.662				
4	^{22}Na	37000	0.511	1.275			
5	^{54}Mn	37000	0.835				
6	^{57}Co	37000	0.122	0.136			
7	^{60}Co	37000	1.173	1.333			
8	Mix ^{137}Cs	18500	0.662				
	^{65}Zn	37000	0.511	1.115			
RSS8EOD2							
1	^{133}Ba	37000	0.081	0.276	0.303	0.356	0.384
2	^{152}Eu	37000	0.121	0.244	0.344	0.562	0.826
			0.963	1.082	1.109	1.408	
3	^{137}Cs	9250	0.662				
4	^{22}Na	37000	0.511	1.275			
5	^{54}Mn	37000	0.835				
6	^{57}Co	37000	0.122	0.136			
7	^{60}Co	37000	1.173	1.333			
8	^{109}Cd	37000	0.088				
RSS8EOD3							
1	^{133}Ba	37000	0.081	0.276	0.303	0.356	0.384
2	^{152}Eu	37000	0.121	0.244	0.344	0.562	0.826
			0.963	1.082	1.109	1.408	
3	^{137}Cs	3700	0.662				
4	^{22}Na	37000	0.511	1.275			
5	^{54}Mn	37000	0.835				
6	^{57}Co	37000	0.122	0.136			
7	^{60}Co	37000	1.173	1.333			
8	^{109}Cd	37000	0.088				
RSS8EOD4							
1	^{133}Ba	37000	0.081	0.276	0.303	0.356	0.384
2	^{152}Eu	37000	0.121	0.244	0.344	0.562	0.826
			0.963	1.082	1.109	1.408	

to be continued...

... continuation

	Nuclide	*Activity [Bq]*	*Peaks of Interest [MeV]*
3	^{137}Cs	3700	0.662
4	^{22}Na	37000	0.511 1.275
5	^{54}Mn	37000	0.835
6	^{57}Co	37000	0.122 0.136
7	^{60}Co	37000	1.173 1.333
8	^{109}Cd	37000	0.088
RSS8EOD5			
1	^{133}Ba	37000	0.081 0.276 0.303 0.356 0.384
2	^{152}Eu	18500	0.121 0.244 0.344 0.562 0.826
			0.963 1.082 1.109 1.408
3	^{137}Cs	3700	0.662
4	^{22}Na	18500	0.511 1.275
5	^{54}Mn	37000	0.835
6	^{57}Co	37000	0.122 0.136
7	^{60}Co	18500	1.173 1.333
8	^{109}Cd	37000	0.088

Appendix A

Info Pool

A.1 identiFINDER R 300: Specifications

Several variants of this product are available.

Ⓐ **identiFINDER R 300 nanoRaider Z**

Cadmium zinc telluride (CdZnTe) detector

Ⓑ **identiFINDER R 300 nanoRaider ZH**

Cadmium zinc telluride (CdZnTe) detector; ^{3}He tube

Specifications relevant for certain variants only are labeled with the variant.

Detectors	
Gamma: CdZnTe	Three crystals; 15 mm (0.59 in) × 13 mm (0.51 in) × 5 mm (0.20 in); ±5 %
Neutrons: ^{3}He Proportional Counter Tube Ⓑ	15 mm (0.59 in) × 54 mm (2.13 in); net: 14 mm (0.55 in) × 29 mm (1.14 in); 8 atm (8.106 bar)
GPS	66-channel MediaTek MT3329 receiver; sensitivity >-165 dBm
Performance	
Energy Range (Gamma); Dose Rate Channel	51 keV – 3 MeV
Energy Range (Gamma); Identification Channel	30 keV – 3 MeV
Throughput; Dose Rate Channel	≤250 kcps
Throughput; Identification Channel	≤180 kcps
Sensitivity (^{137}Cs); Identification Channel	≥0.47 cps per 10 nSv/h
Sensitivity (^{137}Cs); Dose Rate Channel	≥0.81 cps per 10 nSv/h
Gamma Spectrum	1024 channels; 3 MeV

to be continued...

... continuation

Dose Rate Range		≤100 nSv/h – 10 mSv/h (≤10 µrem/h – 1.0 rem/h);
Dose Rate Accuracy (^{137}Cs)		±30 %
Overload Threshold		5 mSv/h
Neutron Sensitivity	Ⓑ	2.6 cps/nv; ±20 %
Nuclide Identification		According to ANSI N42.48
Typical Resolution		≤3.5 % FWHM at 662 keV at 25 °C (77 °F) ambient temperature
Service		
Recommended Interval		5 a
Physical		
Dimensions (W × D × H)		70.3 mm (2.77 in) × 33.8 mm (1.33 in) × 125.5 mm (4.94 in)
Weight	Ⓐ	340 g (11.99 oz)
Weight	Ⓑ	370 g (13.05 oz)
Housing Material		Aluminium
Environmental		
Operating Temperature		-20 °C – +50 °C (-4 °F – +122 °F)
Storage Temperature		+10 °C – +35 °C (+50 °F – +95 °F)
Temperature Change		Temperature change must not exceed 8.4 °C (15.1 °F)/min
Relative Humidity		10 % – 93 %, non condensing
Shock Resistance		According to ANSI N42.48-2008
Protection Rating		IP63 according to IEC 60529
Battery		
Type		Internal (Li-ion, single cell, rechargeable)
Capacity		1950 mAh; 3.7 V; 25 °C (77 °F)
Battery Life		300 – 500 full charge-discharge cycles; 3 a – 5 a
Charging Duration		≤3 h at 25 °C (77 °F) when instrument off and connected to AC power charger and >5.5 h when powered via USB.
Operating Duration		≥24 h at 25 °C (77 °F) in dose rate mode with dimmed display back light and GPS switched off
Display		
Type		Transflective color LCD

to be continued...

... continuation

Size	55.88 mm (2.20 in); 320 pixel × 240 pixel
Central Luminance	400 cd/m^2 typically
Annunciators	
Blue LED Ⓑ	Neutron detection and alarm
Red LED	Gamma alarm
Green LED	Power status
Vibrator	Alarm reporting
Beeper	Alarm reporting
Memory	
Data Storage Capacity	2 GB internal memory; 1800 MB available for the user
Identifications incl. Spectrum	≈600000
Screenshots	≈2500
Alarms	≈1000000
Input, Output	
USB	USB 2.0; mini-B socket
Bluetooth	≤50 m (164.04 ft) range
Software	
Embedded Software	Microsoft Windows CE Operating System
Web Interface	TCP/IP emulated via USB
IPv4	DHCP server included; subnet configurable
IPv6	ULA routing prefix fde6:e89e:44bc::/48 with device specific subnet
Download File Formats	ANSI N42.42 and spc files compatible with third-party analysis software applications such as GADRAS, Cambio, or PeakEasy
Reachback	ANSI N42.42 data via HTTP
Accessories	
DC Power Adapter, Charger	AC in: 100 V – 230 V; 50 Hz – 60 Hz; DC out: 5 V; 2 A
Car Power Adapter, Charger	DC in: 12 V – 24 V; DC out: 5 V; 2 A
Connection Cable	Mini USB-B – USB-A; 1.83 m (6.00 ft)
Holster	60 g (2.12 oz)
Carrying Case	Included

to be continued...

... continuation

Standards	
ANSI N42.48	Performance Requirements for Spectroscopic Personal Radiation Detectors (SPRDs) for Homeland Security
IEC 60529	Degrees of Protection Provided by Enclosures (IP Code)
EMC - Directive 2004/108/EC	Regulations concerning electromagnetic compatibility
FCC Part 15	Regulations concerning electromagnetic compatibility
ANSI N42.42 2006	Data format standard for radiation detectors used for Homeland Security

A.2 Detector Positions

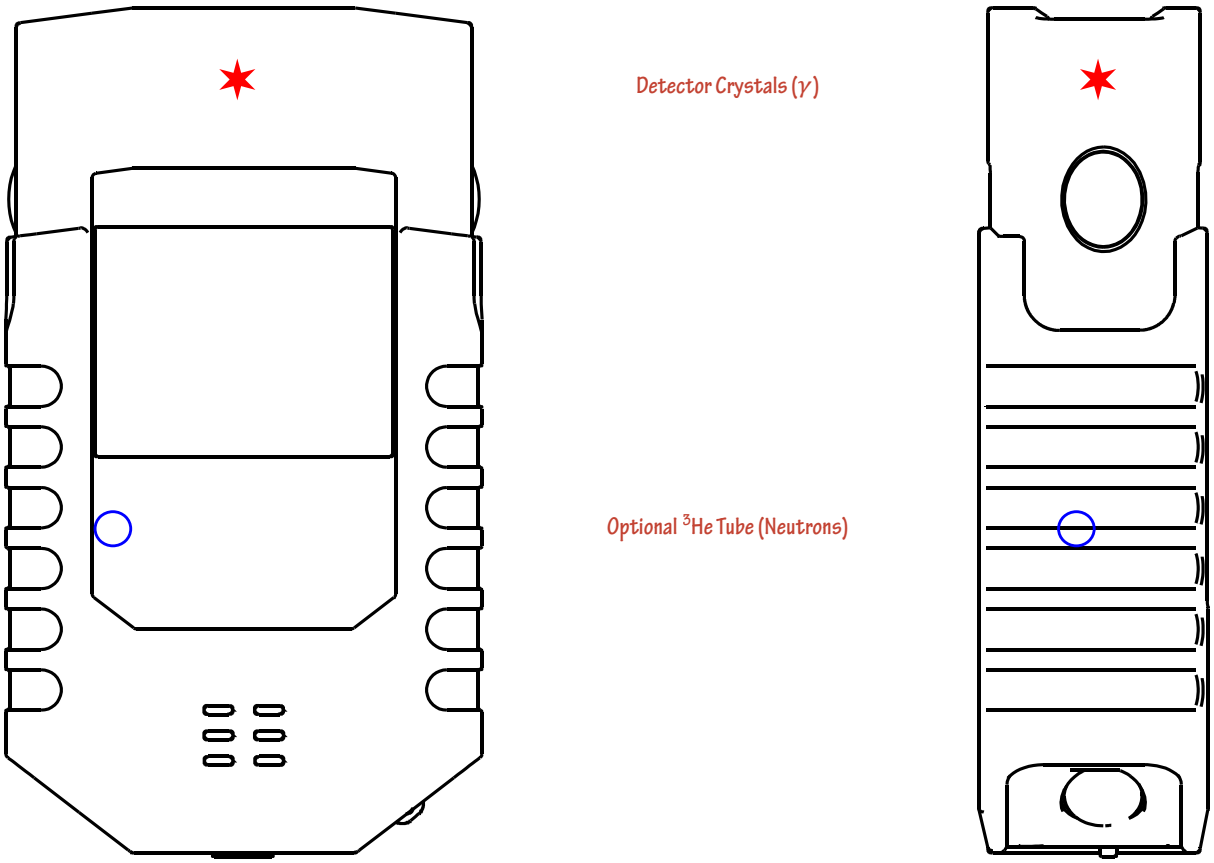

Figure 238. Position of the detector centers of the FLIR identiFINDER R300

A.3 Optimum Illumination of Detector Crystals

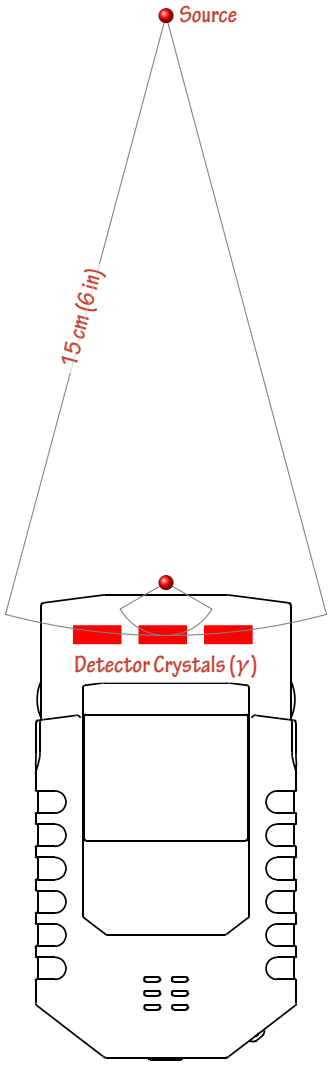

Figure 239. Optimal dose rate calculation needs a uniform illumination of the three detector crystals, for which the source to detector distance should be at least 15 cm (6 in) (drawn to scale).

A.4 Unmanned Neutron Detection

⚠ For unmanned measurements involving un-moderated neutron sources, a 30 cm × 30 cm × 15 cm PMMA phantom (Figure 240, p. 243) or equivalent must be placed between the source and the detector in the FLIR identiFINDER R300 (Figure 238, p. 241) in order to provide adequate moderation of fast neutrons and to simulate field operation instructions in section 3.2.2, p. 71.

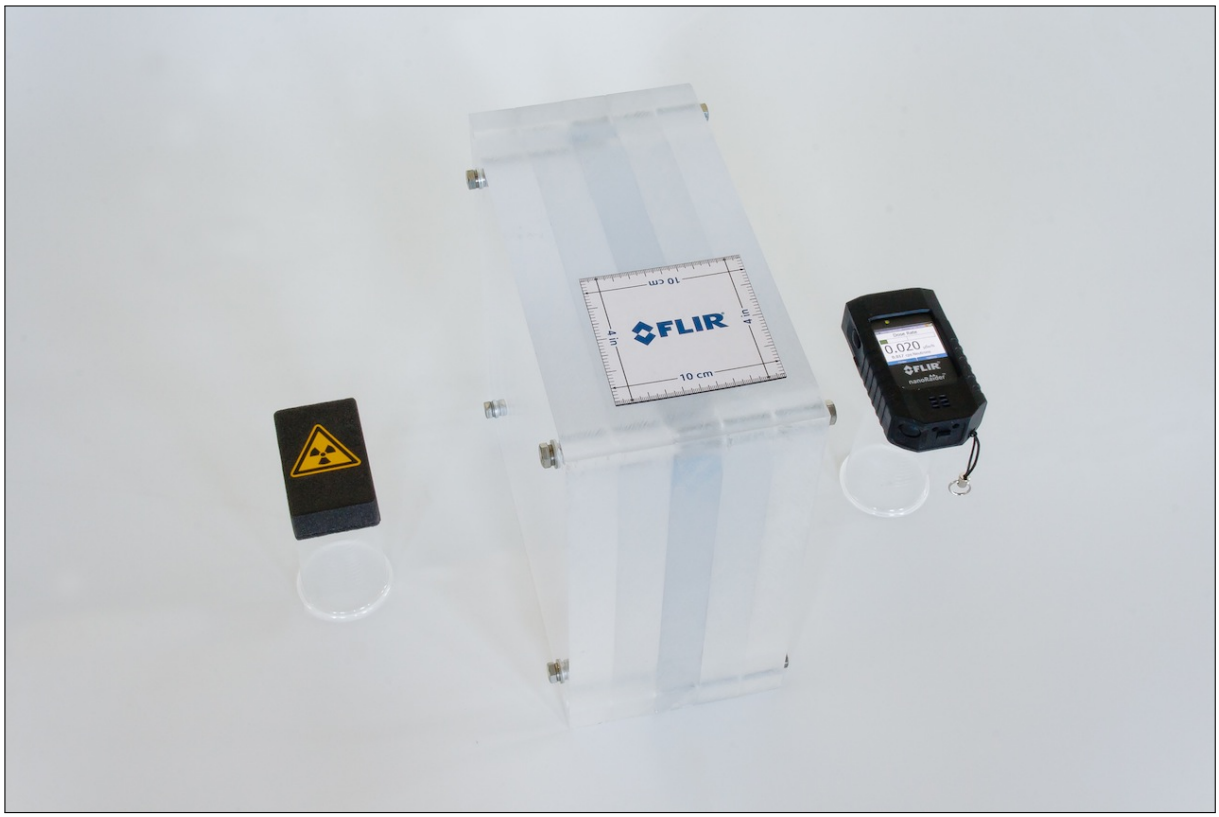

Figure 240. Recommended setup for unmanned measurements of fast neutrons

A.5 Certificates

A.5.1 FLIR identiFINDER R300: Manufacturer's declaration of conformity (CE)

FLIR Radiation GmbH
Piepersberg 12
D - 42653 Solingen
T +49.212.222090
F +49.212.201045

FLIR Extraordinary Protection

EC Declaration of Conformity

According to §7 of EMVG of 15. Dez. 2004 and EMC - Directive 2004/108/EC

Device:	**Radioisotope Identifying Device (RID)**
Type:	**nanoRaider**
Serial Number	**all**
Year of Manufacture:	**2011 -**

Herewith we declare, that the above mentioned device complies with the following EC-Directives including changes and implementation into national law.

EMC Directive 2004/108/EC

Furthermore the following harmonized European standards are exercised *)

DIN EN 61326

*) a complete listing is included in the technical documentation.

The mentioned device is defined for analyzing of gamma radiation.

October 18, 2011

Date

Ralf Lentering
Director of Engineering

A.6 Bluetooth Serial Port Profile (SPP) Communication Overview

While the FLIR identiFINDER R300 has Bluetooth Serial Port Profile (SPP) enabled (see 6.23.1, p. 141) and is connected to a compatible device it will respond to properly formatted queries and can also stream data. This allows integrators to design custom interfaces and for operators to use such interfaces to either listen for or inquire about current instrument status. The following is a description of the FLIR identiFINDER R300 SPP data format.

The following does not apply to Bluetooth Periphery mode and only applies to Bluetooth SPP mode.

A.6.1 Bluetooth Device Name and PIN

A unique Bluetooth device name for each FLIR identiFINDER R300 is set during manufacture and can be provided upon request. Each FLIR identiFINDER R300 will also have a unique PIN (see 6.23.1, p. 141) made up of 16 characters selected from lower-case English alphabet characters (a-z) and numerals (0-9).

A.6.2 Data Format

The FLIR identiFINDER R300 is capable of responding to commands from a device connected via a Bluetooth SPP connection. In addition, the FLIR identiFINDER R300 can be configured to stream data in response to an environmental or user trigger. The commands and triggers are explained in the following sections.

A.6.3 Conventions and Usage Notes

The format of the commands and responses make up a complete and well-formatted XML document, including the XML declaration. The character encoding of these messages shall be UTF-8 and shall not include a byte order marker (BOM).

The NUL character is represented in this document's example listings in C-style notation as \0. It is a single standard byte with the character value of zero.

For the purposes of this specification, any number of NUL (\0) bytes contained **within** the XML message is illegal, since NUL is used as the message delimiter **after** the completed XML. Every message shall be terminated with the NUL character.

XML tags are case sensitive.

Only one command should be sent before receiving a response. If no response is received after 15 seconds, it can be assumed the command was lost or the FLIR identiFINDER R300 is in an unresponsive state.

The example listings use colored text and other font effects for emphasis. This is not part of the XML message. Line breaks and indentation are also for ease of reading and are not required.

The XML messages make extensive use of AttributeName=AttributeValue pairs. Each AttributeName in the defined messages is fixed and will be shown verbatim in the example listings.

However, there is typically more than one possible value for an AttributeValue. Listings will sometimes show placeholder text for an AttributeValue in blue similar to: (PlaceholderText). In actual usage, placeholder text will be replaced with the appropriate text or numerical value.

When a literal value is used in an example instead of placeholder text, it will be shown in red text such as in this attribute pair: `encoding="utf-8"` (See Listing A.1). However, keep in mind that the literal value shown may be only one of several possible values for that AttributeValue. In many cases, other possible values will be enumerated in the description after the listing.

A.6.4 General Command Format

Command messages are sent to the FLIR identiFINDER R300 and will be of the general format shown in Listing A.1:

Listing A.1. General Command Format

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <Command name="(CommandName)">
3    <Argument name="(ArgName)" value="(ArgValue)" />
4    …
5 </Command>\0
```

Line 1: XML Declaration

The XML declaration is the same for all messages and should be verbatim as shown on Line 1.

Line 2: Command element

A command message will contain one `Command` element as the root element. How a command message will be parsed and what (if any) `Argument` child elements will be expected and interpreted are determined by the `name` attribute of the `Command` element, shown in the example with the (CommandName) placeholder value.

Lined 3: Argument element(s)

A command message may contain zero, one or multiple `Argument` elements as children to the root element. Any `Argument` elements will each have two attribute specifications in the form of attribute name, attribute value pairs.

ArgName

Each `Argument` element will have a `name` attribute, shown in the example with the (ArgName) placeholder value.

ArgValue

Each `Argument` element will also have a `value` attribute, shown in the example with the (ArgValue) placeholder value.

Line 4

The ellipsis in this example are not part of the actual message and serve to indicate additional `Argument` elements may be allowed for a command.

Line 5

The root `Command` element is closed, completing the XML portion of the message.

The message is then terminated with the `NUL` character at the end of line 5. This is not part of the XML specification, but is required by the FLIR identiFINDER R300 as a message delimiter.

A.6.5 General Update Format

Update messages are sent from the FLIR identiFINDER R300 as a response to a command or triggered by an event or user setting and will be of the following general format:

Listing A.2. General Update Format

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <Update name="(CommandName)" type="nanoRaider" id="(SerialNumber)">
3    <Property name="(PropertyName)" value="(PropertyValue)"
        units="(PropertyUnits)" />
4    …
5 </Update>\0
```

Line 1: XML Declaration

The XML declaration is the same for all messages.

Line 2: Update element

The message will will contain one `Update` element as the root element.

name

What `Property` child elements will be present are determined by the `name` attribute, shown in the example with the (CommandName) placeholder value. Update messages will contain the same (CommandName) as the command message they are in response to.

type The `type` attribute indicates the device class sending the message. For the FLIR identiFINDER R300 this will be `"nanoRaider"` .

id The `id` attribute, shown in the example with the (SerialNumber) placeholder, will contain the unique serial number of the FLIR identiFINDER R300 sending the message.

The `id` attribute value may contain non-numerical characters. For example, the serial number may contain a dash.

Line 3

An Update message may contain zero, one or multiple `Property` elements as children to the root element. `Property` elements will normally have have two or three attribute specifications in the form of attribute name, attribute value pairs.

name

Each `Property` element will have a `name` attribute, shown in the example with the (PropertyName) placeholder value.

value

Each `Property` element will also have a `value` attribute, shown in the example with the (PropertyValue) placeholder value.

units Some `Property` elements will also have a `units` attribute, shown in the example with the (PropertyUnits) placeholder value.

Line 4

The ellipsis in this example are not part of the actual message and serve to indicate additional `Argument` elements may be allowed for an Update message.

Line 5

The root `Update` element is closed, completing the XML portion of the message.

The message is then terminated with the `NUL` character at the end of line 5. This is not part of the XML specification, but is required by the FLIR identiFINDER R300 as a message delimiter.

A.6.6 General Error Format

Error messages sent from the FLIR identiFINDER R300 will be of the following general format:

Listing A.3. General Error Format

```
1 <?xml version="1.0" encoding="utf-8"?>
```

```
2 <Error name="(CommandName)" type="nanoRaider" id="(SerialNumber)"
    description="(ErrorDescription)" />\0*
```

Line 1: XML Declaration

The XML declaration is the same for all messages.

Line 2: Error element

The message will will contain one `Error` element as the root element.

name

An error message will contain the same (CommandName) present in the command message it is in response to. This is true even if the (CommandName) was invalid. This may also be `"(unknown)"` if the FLIR identiFINDER R300 was unable to parse a command element from the XML message.

type The `type` attribute indicates the device class sending the message. For the FLIR identiFINDER R300 this will be `"nanoRaider"`.

description

The `description` attribute, shown in the example with the (ErrorDescription) placeholder, will contain a brief textual description of the error condition and/or cause. The following are examples of some actual error descriptions:

`"Unknown command."`

`"Malformed XML message received."`

`"Spectra id 416 does not exist."`

A.7 SPP Commands and Updates

A.7.1 Ping

The Ping command will generate a Ping update from the FLIR identiFINDER R300. This can be used to verify SPP communication is functional and to determine the device serial number.

Listing A.4. Ping Command

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <Command name="Ping" />\0
```

The Ping command should be verbatim as shown in the listing.

Listing A.5. Ping Update

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <Update name="Ping" type="nanoRaider" id="(SerialNumber)" />\0
```

*Test footnote.

Line 1: XML Declaration

The XML declaration is the same for all messages.

Line 2: Update element

The message will will contain one `Update` element as the root element.

name

A Ping update will always report `"Ping""` as the `name` attribute.

type The `type` attribute indicates the device class sending the message. For the FLIR identiFINDER R300 this will be `"nanoRaider"` .

The root `Update` element is closed, completing the XML portion of the message.

The message is then terminated with the `NUL` character at the end of line 2. This is not part of the XML specification, but is required by the FLIR identiFINDER R300 as a message delimiter.

A.7.2 Status

A Status update message can be queried through the command specified below or is periodically transmitted during the presence of a radiation or low battery alarm.

Listing A.6. Status Command

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <Command name="Status" />\0
```

Listing A.7. Example Status Update

```
1  <?xml version="1.0" encoding="utf-8"?>
2  <Update name="Status" type="nanoRaider" id="(SerialNumber)">
3    <Property name="BatteryLevel" value="53" units="pct" />
4    <Property name="Stabilization" value="true" />
5    <Property name="GMMode" value="true" />
6    <Property name="DoseRate" value="10" units="µrem/h" />
7    <Property name="Counts" value="100" units="counts" />
8    <Property name="NeutronRate" value="10" units="cps" />
9    <Property name="OperatingMode" value="Finder" />
10   <Property name="DoseRateWarningThres" value="27" units="µrem/h" />
11   <Property name="DoseRateAlarmThres" value="20000" units="µrem/h" />
12   <Property name="DoseWarningThres" value="27" units="mrem" />
13   <Property name="DoseAlarmThres" value="20000" units="mrem" />
14   <Property name="NeutronRateWarningThres" value="27" units="cps" />
15   <Property name="NeutronRateAlarmThres" value="20000" units="cps" />
16   <Property name="GPSValid" value="true" />
17   <Property name="Longitude" value="-84.2625" units="deg" />
```

```
18   <Property name="Latitude" value="36.013333" units="deg" />
19   <Property name="LastSpectrumNumber" value="53" />
20   <Property name="BatteryLow" value="false" />
21   <Property name="Overload" value="false" />
22   <Property name="Alarm" value="false" />
23   <Property name="DoseRateWarning" value="false" />
24   <Property name="DoseRateAlarm" value="false" />
25   <Property name="DoseAlarm" value="false" />
26   <Property name="NeutronCountRateWarning" value="false" />=
27   <Property name="NeutronCountRateAlarm" value="false" />
28   <Property name="SigmaGammaAlarm" value="false" />
29   <Property name="SigmaNeutronAlarm" value="false" />
30 </Update>\0
```

Property Elements

As shown, there are multiple `Property` elements in a Status update.

name

For reliability and future compatibility, a parser should not rely on the order of the `Property` elements but should parse the `name` attribute of each `Property` element.

value

For each `Property` element in a status update, the `value` attribute will be either textual or numerical. Many of those elements with a textual `value` attribute indicate a boolean state with the value being either `"true"` or `"false"`.

units A `units` attribute will be included when necessary to interpret a numerical `value` attributes. Only some `Property` elements have units.

Line 2:

The (SerialNumber) placeholder in the example will be replaced with the unique serial number of the FLIR identiFINDER R300 sending the message.

Stabilization (Line 4):

Stabilization is only available on models without LED stabilization.

Dose and Dose Rate units

Any dose `units` will be in either rem or Sievert (Sv) scaled units as required by the FLIR identiFINDER R300 settings (see 6.31, p. 159). The specified base unit for some properties will be dynamically scaled according to the property `value` while others are statically scaled in the FLIR identiFINDER R300 settings.

Dose units (Lines 12 and 13)

DoseWarningThres and DoseAlarmThres use dose units. The possible scaled rem units are "rem", "mrem", "µrem", and "nrem". The possible scaled Sievert units are "Sv", "mSv", "µSv", and "nSv".

Dose rate units (Lines 6, 10 and 11):

DoseRate, DoseRateWarningThres, and DoseRateAlarmThres use dose rate units. The possible scaled rem per hour units are "rem/h", "mrem/h", "µrem/h", and "nrem/h". The possible scaled Sieverts per hour units are "Sv/h", "mSv/h", "µSv/h", and "nSv/h".

Operating Mode (Line 9):

OperatingMode indicates the current mode the FLIR identiFINDER R300 is operating in. Possible values include: "DoseRate", "Finder", "Identify", or "Other".

Neutron Information (Lines 14, 15, 26, 27, and 29):

NeutronRateWarningThres, NeutronRateAlarmThres, NeutronCountRateWarning, NeutronCountRateAlarm, and SigmaNeutronAlarm are only available on instruments that contain an He-3 tube.

Sigma Alarms (Lines 28 and 29):

Sigma alarms are currently available only on R300 products.

A.7.3 Get Spectra

The "GetSpectra" information can be queried through the command specified below or is automatically transmitted upon selection of "send" on the user interface of the device.

Listing A.8. GetSpectra Command

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <Command name="GetSpectra">
3   <Argument name="Number" value="(SpectrumNumber)" />
4 </Command>\0
```

Line3: Spectrum Number

If the GetSpectra command has an Argument element then it must contain a name attribute with a value of "Number" and a value attribute with a numerical value specifying the record number of the spectrum to send.

Omit the Argument element to retrieve highest spectrum number.

Listing A.9. GetSpectra Update

```
1 <?xml version="1.0" encoding="utf-8"?>
```

```
<Update name="GetSpectra" type="nanoRaider" id="(SerialNumber)">
   <Property name="Spectra" value="(base64 encoded n42 file)" />
</Update>\0
```

Line 3: Spectra

The GetSpectra update will contain a base64 encoded string which can be decoded into an ANSI N42.42 2006 (p. 269) file of the requested spectra. The encoded data is represented in the example listing with the (base64 encoded n42 file) placeholder. Base64 decoding is outside the scope of this document.

All commands and updates below this point provide properties that are already contained in the Status update message. These are to be used if additional granularity is required.

A.7.4 Counts

Listing A.10. Counts Command

```
<?xml version="1.0" encoding="utf-8"?>
<Command name="Counts" />\0
```

Listing A.11. Counts Update

```
<?xml version="1.0" encoding="utf-8"?>
<Update name="Counts" type="nanoRaider" id="(SerialNumber)">
  <Property name="Counts" value="100" units="counts" />
</Update>\0
```

A.7.5 Dose Rate

Listing A.12. DoseRate Command

```
<?xml version="1.0" encoding="utf-8"?>
<Command name="DoseRate" />\0
```

Listing A.13. DoseRate Update

```
<?xml version="1.0" encoding="utf-8"?>
<Update name="DoseRate" type="nanoRaider" id="(SerialNumber)">
   <Property name="DoseRate" value="10" units="µrem/h" />
</Update>\0
```

A.7.6 Neutron Rate

Neutron properties are only available on instruments that contain an He-3 tube.

Listing A.14. NeutronRate Command

```
<?xml version="1.0" encoding="utf-8"?>
<Command name="NeutronRate" />\0
```

Listing A.15. NeutronRate Update

```
<?xml version="1.0" encoding="utf-8"?>
<Update name="NeutronRate" type="nanoRaider" id="(SerialNumber)">
   <Property name="NeutronRate" value="10" units="cps" />
</Update>\0
```

A.7.7 Serial Number

Listing A.16. SerialNumber Command

```
<?xml version="1.0" encoding="utf-8"?>
<Command name="SerialNumber" />\0
```

Listing A.17. SerialNumber Update

```
<?xml version="1.0" encoding="utf-8"?>
<Update name="SerialNumber" type="nanoRaider" id="(SerialNumber)" />\0
```

A.7.8 Other Commands and Updates

Other command and update implementations can be considered upon request. Please feel free to contact FLIR Detection with any questions or comments.

Appendix B

Maintenance

B.1 Field Maintenance

The FLIR identiFINDER R300 requires neither field maintenance nor field calibration. Under no circumstances should any part of the housing be penetrated or removed.

If necessary, clean the instrument with a dry lint-free cloth.

After certain service intervals (see A.1, p. 237) you should send the FLIR identiFINDER R300 to a service organization (see B.4, p. 257) for preventive maintenance and performance optimization.

B.2 Software Installation

Software like firmware or application updates can be uploaded to the FLIR identiFINDER R300 via the administration page of the web server (see 8.17, p. 215).

The FLIR identiFINDER R300 accepts uploaded files only with correct digital signature.

The FLIR identiFINDER R300 displays a message after it received a file (Figure 241, p. 256). Press Ignore to discard the file or Install to install it.

The display keeps you posted about the processing of the file and the FLIR identiFINDER R300 will restart after the successful installation.

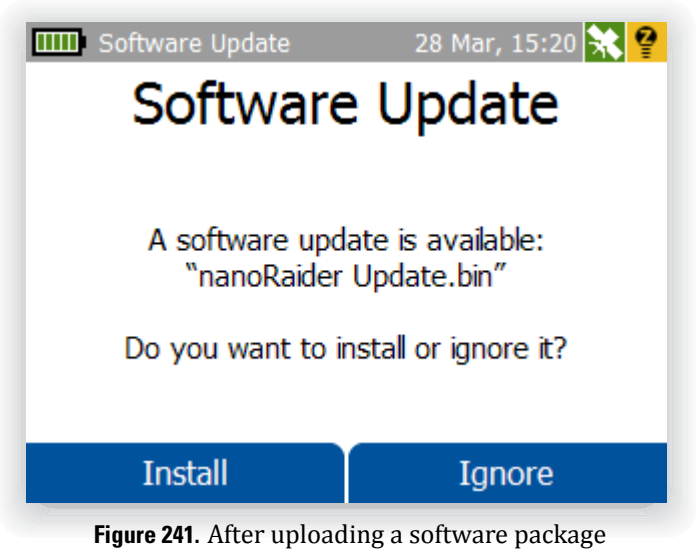

Figure 241. After uploading a software package

B.3 Storage

The FLIR identiFINDER R300 should be stored in a dry and clean location. If possible, it should be stored at room temperature.

B.4 After Sales Service and Support

Please keep the serial number and the version information (Figure 3, p. 23, Figure 138, p. 131) ready when contacting our customer support.

FLIR Detection has service centers throughout the world. To locate your local service center please refer to the website (detectionsupport.com/radiation/).

FLIR Detection, Inc.

100 Midland Road
Oak Ridge, TN 37830
USA

☎ + 1.865.220.8700
+ 1.865.220.7181

Appendix C

Nuclide Library

The FLIR identiFINDER R300 can identify and report some special radiation sources and a number of radionuclides as listed in this appendix.

The usage and severity association given in the table represents the factory defaults. You can adapt the association of nuclides with usage (6.6, p. 119) and severity (6.7, p. 120) to your particular demands.

The table is sorted by element names and lists the following properties of radiation sources.

- Nuclide name in standard notation
- `Nuclide name` in simplified notation
- Half life
- Severity
  - I Innocent
  - S Suspicious
  - T Threatening
- Usage

  NORM: Naturally occurring radioactive material

  MED: Medically used material

  IND: Industrially used material

  SNM: Special nuclear material

  NUC: Former name for SNM
- Remarks on occurrence or application

Annihilation		*Annihilation Radiation* I *Industrially used material* Annihilation radiation is released by the electron-positron extermination caused by the beta+ decay. It has a fixed energy of 511 keV and is caused by all beta+ radiators. Common examples are ^{18}F (used for medical applications) or ^{22}Na which also emits gamma radiation.
Background		I *Naturally occurring radioactive material* The ubiquitous background radiation is emitted from a variety of mostly natural and some artificial sources such as unstable nuclides contained in most chemical elements comprising the lithosphere, biosphere, and atmosphere; cosmic radiation from outer space; and applications of nuclear technology for weapons, power plants and medicine. The background recorded by an instrument is, of course, spoiled by non-natural sources present while measuring the background.
Neutrons		T *Special nuclear material* Neutron radiation can have different origins, the most common types are spontaneous fission sources (e. g. ^{252}Cf) and alpha emitters packaged in a low-Z elemental matrix (e. g. Americium-Beryllium, Americium-Lithium or Plutonium-Beryllium). Both types have a wide range of applications, including industrial and medical fields. Neutrons can also occur in the vicinity of nuclear power plants driven by neutrons that collide with the fission material, typically using one of the above sources.
Unknown		S *Unknown nuclear material* An unknown source of radiation. Further investigations are necessary.
Americium		
$^{241}_{95}Am$ Am-241	433 a	T *Industrially used material* Most commonly used in smoke detectors and to measure levels of toxic lead in paint samples. Also used to ensure uniform thickness in rolling processes like steel and paper production. May be combined with beryllium or lithium to produce a neutron source.

to be continued...

... continuation

Barium		
$^{133}_{56}$Ba Ba-133	10.75 a	I *Industrially used material* Used in nuclear medicine for patient attenuation correction during an imaging technique (i.e. S.P.E.C.T. imaging) for yielding 3D information of the patient's internal organs, etc.
Bismuth		
$^{207}_{83}$Bi Bi-207	38 a	I *Industrially used material* Principle use is for research and may be found as a by-product of proton reactions with lead.
Cadmium		
$^{109}_{48}$Cd Cd-109	463 d	I *Industrially used material* Used to analyze metal alloys when checking stock and also sorting scrap.
Cesium		
$^{134}_{55}$Cs Cs-134	2.07 a	I *Industrially used material* Used as a tracer for radiation leaks. This nuclide is a fission product in nuclear reactors. It can occur in the radioactive fall-out resulting from hazardous incidents in nuclear power plants.
$^{137}_{55}$Cs Cs-137	30.07 a	I *Industrially used material* Used as radiotracers to measure and control the liquid flow in oil pipelines and to tell researchers whether oil wells are plugged by sand. Utilized in density and fill height sensors to ensure the correct fill level for food, drugs and other products. This nuclide is a fission product in nuclear reactors. It can occur in the radioactive fall-out resulting from hazardous incidents in nuclear power plants.
Chromium		
$^{51}_{24}$Cr Cr-51	27 d 17 h	I *Industrially used material* Used in research in red blood cell survival studies.
Cobalt		
$^{57}_{27}$Co Co-57	272 d	I *Industrially used material* Included in medical in-vitro diagnostic kits, it is commonly used as a radiological "marker" to estimate organ size.

to be continued...

... continuation

$^{60}_{27}$Co Co-60	5.3 a	*Industrially used material* Used to sterilize surgical instruments and to improve the safety and reliability of industrial fuel oil burners. Also used in cancer treatment, food irradiation, industrial gauges and radiography.
Europium		
$^{152}_{63}$Eu Eu-152	13.5 a	*Industrially used material* Used in nuclear reactor control rods. In some countries this nuclide has been substituted in place of ^{60}Co for radiation therapy.
Gallium		
$^{67}_{31}$Ga Ga-67	3 d 6 h	*Medically used material* Used to pinpoint infections and tumors. Also used in PET scans for studying the brain and the heart functions.
Holmium		
$^{166m}_{67}$Ho Ho-166m	1200 a	*Industrially used material* Used in physics experiments and research and can also be used in nuclear control rods used in reactors.
Indium		
$^{111}_{49}$In In-111	2 d 19 h	*Medically used material* Used for special diagnostic studies, e.g. brain studies, infection and colon transit studies.
Iodine		
$^{123}_{53}$I I-123	13 h	*Medically used material* Used to diagnose thyroid function/dysfunction. Also used in PET scans for studying the brain and the heart functions.
$^{125}_{53}$I I-125	60 d	*Medically used material* Used in a medical procedure for detecting hormone levels in the blood. Used for cancer treatment of the brain and prostate. It is also used to diagnose deep vein blood clots in the leg, and certain kinds of kidney maladies.
$^{131}_{53}$I I-131	8 d	*Medically used material* Used for therapy such as imaging the thyroid and treating its related cancers. Also used to diagnose abnormal liver function, kidney blood flow and urinary tract obstruction. This nuclide is a fission product in nuclear reactors. It can occur in the radioactive fall-out resulting from hazardous incidents in nuclear power plants.

to be continued...

... continuation

Iridium		
$^{192}_{77}$Ir Ir-192	74 d	I *Industrially used material* Temporarily implanted in wire form for use as an internal radiotherapy source in cancer treatment. Also used to test the integrity of pipeline welds, boilers and aircraft parts.
Manganese		
$^{54}_{25}$Mn Mn-54	312 d	I *Industrially used material* Used to study and predict the behavior of heavy metal pollutants within the outflow of waste water from mining operations.
Molybdenum		
$^{99}_{42}$Mo Mo-99	2 d 18 h	I *Industrially used material* Used for generating ^{99m}Tc.
Neptunium		
$^{237}_{93}$Np Np-237	2.14 Ma	T *Special nuclear material* No major commerical uses except in the production of ^{238}Pu.
Plutonium		
$^{mix}_{94}$Pu Plutonium	6561 a; 24100 a	T *Special nuclear material* A mixture of ^{240}Pu and ^{239}Pu in various concentrations. Mixtures with low ^{240}Pu concentration are used to build most nuclear fission weapons, bombs, and warheads.
Potassium		
$^{40}_{19}$K K-40	1.277 Ga	I *Naturally occurring radioactive material* There are no specific commercial or medical uses for this isotope of potassium, but it is occurring naturally. Typical concentrations found in food deliver 140 µSv/a–180 µSv/a. Higher ^{40}K concentrations can present a considerable cancer inducing risk.
Radium		
$^{226}_{88}$Ra Ra-226	1600 a	I *Naturally occurring radioactive material* A decay product of uranium and thorium, it occurs in virtually all rock, soil, and water in low concentrations. 20 % of the ^{226}Ra that is ingested via food and water is deposited into the bone. Although this makes the nuclide dangerous itself, it presents its greatest risk when it decays into ^{222}Ra, which is an odorless, tasteless, radioactive gas that can be inhaled into the lungs.

to be continued...

... continuation

Samarium		
$^{153}_{62}$Sm Sm-153	47 h	I *Industrially used material* Pharmaceutically marketed as “Quadramet”, it is used for relieving pain caused by secondary cancers within the bone. Also used for treating prostate and breast cancer.
Selenium		
$^{75}_{34}$Se Se-75	120 d	I *Industrially used material* In the form of seleno-methionine this nuclide is used to investigate enzyme production in the digestive tract.
Silver		
$^{110m}_{47}$Ag Ag-110m	249 d 19 h	I *Industrially used material* Used as a radiotracer for biological and industrial research.
Sodium		
$^{22}_{11}$Na Na-22	2.6 a	I *Industrially used material* Used to study the sodium-potassium exchange-dynamic of nerve axons within the nervous systems of living organisms. Also used to locate leaks in industrial pipe lines and in oil well studies.
Technetium		
$^{99m}_{43}$Tc Tc-99m	6 h 1 m	I *Medically used material* Used for imaging the heart muscle, lungs, brain, and the skeletal system. Other uses include imaging the kidney, liver, thyroid, spleen, gall bladder, salivary and lacrimal glands, and the heart blood pool. It is also used to investigate other medical issues, like certain types of infections. Also used for tracing sewage and liquid waste movements within city infrastructures. This nuclide is a fission product in nuclear reactors. It can occur in the radioactive fall-out resulting from hazardous incidents in nuclear power plants.
Thallium		
$^{201}_{81}$Tl Tl-201	3 d 1 h	I *Medically used material* Used for diagnosing coronary artery disease and other heart problems.

to be continued...

... continuation

Thorium		
$^{232}_{90}$Th Th-232/U-232	14.05 Ga	*^{232}Th or ^{232}U* I *Naturally occurring radioactive material* Found naturally occurring in abundance within the earth crust, it is not fissile itself, but can be used to generate the fissile element ^{233}U. ^{232}Th is used in gas lantern mantles and WIG welding rods. The spectra of ^{232}Th and ^{232}U are very similar.
Uranium		
$^{232}_{92}$U U-232/Th-232	68.9 a	*^{232}U or ^{232}Th* T *Special nuclear material* The spectra of ^{232}Th and ^{232}U are very similar.
$^{233}_{92}$U U-233	160 ka	T *Special nuclear material* Used in nuclear power generators. Although the United States demonstrated/detonated in 1955 a ^{233}U based bomb core, the use of ^{233}U within a weapon is not as viable of a choice for a weapon when compared to ^{235}U.
$^{235}_{92}$U U-235	704 Ma	T *Special nuclear material* Can be effectively used to manufacture a nuclear fission weapon, and is a primary concern because the design complexity required is far less than that required for a ^{239}Pu based weapon.
$^{238}_{92}$U U-238	4.468 Ga	T *Special nuclear material* Used as a base material for generating ^{239}Pu.
$^{mix}_{92}$U Uranium	704 Ma; 4.468 Ga	T *Special nuclear material* A mixture of ^{238}U and ^{235}U in various concentrations from depleted to highly enriched ^{235}U. Can be effectively used to manufacture a nuclear fission weapon, and is a primary concern because the design complexity required is far less than that required for a ^{239}Pu based weapon.
Xenon		
$^{133}_{54}$Xe Xe-133	5 d 6 h	I *Medically used material* ^{133}Xe is used for blood flow measurements and to image the heart, lungs, and brain, for example, by means of tomography.

Appendix D

Glossary

This glossary lists terms, units, and abbreviations used throughout this document and provides a brief explanation. For detailed information consult a textbook or an encyclopedia.

12-Hour Clock

A historic convention in which the 24 hours of the day are split into two halves called *ante meridiem* (a.m., "before mid day") and *post meridiem* (p.m., "after mid day"). Each half comprises 12 hours numbered: 12 (acting as zero), 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11. (see Table 4, p. 287, ↗24-Hour Clock)

Table 3. The 12- and 24-hour clock notation.

12-Hour Clock	24-hour Clock
midnight (begin of day) 12:00 a.m.	00:00
12:01 a.m.	00:01
12:59 a.m.	00:59
1:00 a.m.	01:00
2:00 a.m.	02:00
…	…
11:00 a.m.	11:00
11:59 a.m.	11:59
noon 12:00 p.m.	12:00
12:01 p.m.	12:01
12:59 p.m.	12:59
1:00 p.m.	13:00
2:00 p.m.	14:00
…	…
11:00 p.m.	23:00
11:59 p.m.	23:59
midnight (end of day)	00:00 (of next day)

24-Hour Clock

The ↗ISO 8601 convention of time keeping dividing the day running from midnight to midnight into 24 hours. The notation indicates the hours passed since midnight from 0 to 23. (cf ↗12-Hour Clock)

Also known as: Army Time, Military Time, Astronomical Time, Radio Time, Railway Time, Continental Time

A ↗Mass Number

α Particle

↗Alpha Particle

α Radiation

↗Alpha Radiation

Absorbed Dose

The amount of energy deposited in matter by ↗Ionizing Radiation given in ↗Gray. In contrast to the ↗Equivalent Dose, the absorbed dose does not differentiate the biological effects of the ionizing radiation.

Acrylic Glass

↗Polymethyl Methacrylate

Activity

The number of disintegrations of an excited state in a ↗Nucleus per duration given in ↗Becquerel.

Activity Concentration

↗Specific Activity

Adjustment

↗Calibration

Alarm

An audible, visual, or other signal activated when an instrument reading or response exceeds a preset value or falls outside of a preset range.

Alpha Particle

Two ↗Protons and two ↗Neutrons, strongly bound together. It is the ↗Nucleus of the helium atom $^{4}_{2}$He. Alpha (α) particles are commonly emitted during the ↗Decay of heavy ↗Nuclei.

Also known as: α Particle

Alpha Radiation

A ↗Particle Radiation of ↗Alpha Particles. Alpha radiation has a short range in matter, due to its positive charge and heavy mass, being relatively easy to shield, for example by a sheet of paper (Figure 245, p. 283). However, it poses a great health hazard when alpha radiators are ingested by organisms.

Also known as: α Radiation

American National Standards Institute (ANSI)

An organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the USA.

ANSI ↗American National Standards Institute

ANSI N42.42

An ↗XML-based data format standard for radiation detectors used for homeland security. Sometimes a version is specified with the year of release, for example, ANSI N42.42 2006.

ANSI N42.42 formatted files can be processed and analyzed with third-party software including, for example, applications provided by public institutions such as Cambio and GADRAS (Sandia National Laboratories, USA, `http://www.sandia.gov`), or PeakEasy (Los Alamos National Laboratory, USA, `http://www.lanl.gov`).

Also known as: N42

Army Time

↗24-Hour Clock

Astronomical Time

↗24-Hour Clock

Atom The basic unit of matter consisting of a ↗Nucleus surrounded by a cloud of ↗Electrons.

Atomic Mass

The mass of a specific ↗Isotope, sum of the masses of all ↗Protons, ↗Neutrons (↗Mass Number), and ↗Electrons.

Atomic Mass Number

↗Mass Number

Atomic Number (Z)

The number of ↗Protons in the ↗Nucleus of an ↗Atom.

Also known as: Proton Number

β Particle

↗Beta Particle

β Radiation

↗Beta Radiation

Background Radiation

The ubiquitous radiation in the environment, emitted from a variety of mostly natural and a few man-made sources. Natural sources are terrestrial (↗Decay of ↗Radionuclides like ^{235}U or ^{232}Th abundant in the Earth crust) or cosmic (high-energy ↗Protons originating primarily from the Sun interact with the upper Earth atmosphere creating a shower of secondary radiation).

Becquerel (Bq)

The becquerel is the ↗SI derived unit of radioactivity. One Bq is defined as the ↗Activity of a quantity of radioactive material in which one ↗Nucleus decays per second. (↗Curie)

$$1\,\mathrm{Bq} = \frac{1}{\mathrm{s}}$$

Beta Particle

High-energy, high-speed ↗Electrons (β^-) or ↗Positrons (β^+) emitted as ↗Beta Radiation. The ↗Decay of ↗Neutrons to ↗Protons emits beta particles and antineutrinos.

Also known as: β Particle

Beta Radiation

A ↗Particle Radiation of ↗Beta Particles. Beta Radiation can usually be shielded by a sheet of metal, for example, Al foil (Figure 245, p. 283). Beta radiation ionizes the surface of organisms and can lead to severe burns with long-term sequelae like skin cancer.

Also known as: β Radiation

Bluetooth

A standardized open wireless technology for data communication over short distances using radio waves.

Bq ↗Becquerel

$(C_2H_4)_n$

↗Polyethylene

$(C_5H_8O_2)_n$

↗Polymethyl Methacrylate

Cadmium Zinc Telluride (CZT, CdZnTe)

An alloy of cadmium telluride and zinc telluride, a substance to build ↗Semiconductor Radiation Detectors usable at room temperature.

Calibration

A defined procedure for the comparison of the reading of an instrument to the value conventionally accepted as correct (a “standard”).

In less strict use of the term, calibration is regarded as including the adjustment of the reading of the instrument to agree with the standard, within a specified accuracy.

Also known as: Adjustment

CBRNE

Acronym for chemical, biological, radiological, nuclear, and explosive. It refers to incidents or weapons presenting any of these hazards.

CdZnTe

↗Cadmium Zinc Telluride

Cesium Lithium Yttrium Chloride (CLYC, Cs_2LiYCl_6:Ce)

Substance to build ↗Scintillation Counters usable for gamma spectroscopy and the detection of thermal ↗Neutrons.

Chemical Element

↗Element

CLYC ↗Cesium Lithium Yttrium Chloride

CONOPS, CONOPs, ConOps

A Concept of Operations is a document describing the characteristics of a system from the viewpoint of an individual user of that system. CONOPS are widely used in the US military or government services.

Continental Time

↗24-Hour Clock

Coordinated Universal Time (UTC)

A time standard based on International Atomic Time. Time zones are specified as positive or negative offsets from UTC.

Count

A single detected event registered by a detection system.

Cs_2LiYCl_6:Ce

↗Cesium Lithium Yttrium Chloride

Curie

The curie is an older, non-↗SI unit of radioactivity. (↗Becquerel)

$$1\,\mathrm{Ci} = 3.7 \times 10^{10}\,\mathrm{Bq};\ 1\,\mathrm{Bq} = 2.70 \times 10^{-11}\,\mathrm{Ci}$$

CZT ↗Cadmium Zinc Telluride

Dead Time (DT)

The dead time of a detection system is the time after each event during which the system is busy and hence is not able to record another event if it happens. An everyday analogon is the time you have to wait after taking a photo with flash to recharge the flash for the next photo.

Decay

The process by which an unstable ↗Nuclide (parent) loses energy by emitting ↗Ionizing Radiation and transforming to another nuclide (daughter). Decay of a single nuclide is spontaneous, that is, it neither needs external triggering nor is it predictable. The average decay rate of a large number of nuclides, however, is predictable and usually given as ↗Half Life.

Also known as: Disintegration, Radioactive Decay

***Deutsches Institut für Normung* (DIN)**

The German national organization for standardization, represents Germany in the ↗ISO.

DHS Department of Homeland Security (USA)

Dial-Up Networking (DUN)

A ↗Bluetooth communications profile to access the Internet or other dial-up services.

DIN ↗*Deutsches Institut für Normung*

Dirty Bomb

↗Radiological Dispersion Device

Disintegration

↗Decay

DNDO

Domestic Nuclear Detection Office of the ↗DHS (USA)

Dose A measure of the ↗Ionizing Radiation energy transfer to, for example, tissue (↗Sievert).

Dose Rate

The quotient of ↗Dose given in ↗Sievert and time.

DT ↗Dead Time

DUN ↗Dial-Up Networking

Electromagnetic Radiation

Self-propagating waves comprising electric and magnetic field components. The ↗Spectrum ranges from low-frequent radio waves (longer waves), microwaves, visible light, ultraviolet radiation, X-rays up to high-frequent ↗Gamma Radiation (shorter waves).

Electron

A subatomic particle with a negative electric charge, counterpart of the ↗Positron. It is emitted as ↗Beta Radiation.

Electron Volt (eV)

The electron volt is a non-↗SI unit of energy (↗Joule) employed in radiation physics. It is equal to the amount of kinetic energy gained by a single unbound electron when it accelerates through an electrostatic potential difference of one volt.

$$1\,\mathrm{eV} \approx 1.602177 \times 10^{-19}\,\mathrm{J}$$

Element

Pure substance consisting of ↗Nuclides having the same number of ↗Protons (also known as ↗Atomic Number) sharing the same chemical properties. The nuclear properties differ if the number of ↗Neutrons varies in the nuclides (↗Isotope).

Also known as: Chemical Element

Equivalent Dose

A measure of the radiation ↗Dose absorbed by tissue where an attempt has been made to consider the different relative biological effects of different types of ↗Ionizing Radiation.

The equivalent dose is calculated by weighting the ↗Absorbed Dose with a factor selected for the type and energy of the radiation. The weighting factor ranges from 1 for ↗Gamma Radiation and ↗Beta Radiation to higher values for ↗Alpha Radiation, ↗Protons, and ↗Neutrons.

eV ↗Electron Volt

Extensible Markup Language

↗XML

False Alarm

An ↗Alarm *not* caused by a radioactive source under the specified background conditions.

False Alarm Rate (FAR)

The number of ↗False Alarms per duration.

FAR ↗False Alarm Rate

Fast Neutron

↗Neutron Temperature

FGPu ↗Fuel-Grade Plutonium

Fission

An exothermic nuclear process in which a ↗Nucleus is usually absorbing a ↗Neutron and two fission fragments and a few fission neutrons emerge.

Also known as: Nuclear Fission

Fuel-Grade Plutonium (FGPu)

A mixture of ^{239}Pu, ^{240}Pu and other ↗Isotopes, which contains between 7 % and 19 % ^{240}Pu. Further grades are ↗Reactor-Grade Plutonium and ↗Weapons-Grade Plutonium.

Full Width at Half Maximum (FWHM)

The full width at half maximum height of a ↗Peak in a ↗Spectrum (Figure 242, p. 274).

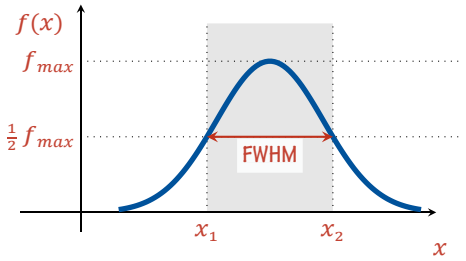

Figure 242. Full width at half maximum height of a peak

Fusion

An exothermic nuclear process in which two or more light ↗Nuclei are confined together forming a heavier nucleus. The magnetic confinement is usually realized in plasma devices as e.g. a Tokamak or a Stellarator. A Tokamak is a toroidal chamber surrounded by magnetic coils. It can be seen as a huge current transformator, which produces enough potential to ignite a plasma inside the chamber. Contrary to the symmetric appearance of a Tokamak, a Stellarator has a non-symmetric, highly complex field and chamber design.

Also known as: Nuclear Fusion

FWHM

↗Full Width at Half Maximum

γ Radiation

↗Gamma Radiation

Gamma Radiation

Gamma (γ) radiation is energetic (typically >100 keV) ↗Electromagnetic Radiation of high frequency (typically $>10^{19}$ Hz) and very short wavelength (typically $<10^{-11}$ m).

Gamma radiation originating from ↗Decay typically carries energies from a few hundred keV to about 10 MeV and is ↗Ionizing Radiation.

Gamma radiation penetrates deeply and is difficult to stop. It can be stopped by a sufficiently thick layer of material with high ↗Atomic Number, such as $_{82}$Pb (lead, Figure 245, p. 283).

Also known as: γ Radiation

Gamma Ray Detection

Gamma rays can be detected by observing their interaction with matter. Some materials emit visible light when hit by gamma rays (↗Scintillator), some gases are ionized and conduct electricity (↗Geiger–Müller Tube), or some semiconductors (↗Semiconductor Radiation Detector) change electric conductivity when exposed to gamma radiation.

Ge ↗Germanium

Geiger–Müller Tube (GM Tube)

A device to detect ↗Ionizing Radiation consisting of a tube filled with low-pressure noble and halogene gas in a strong electric field. Incident radiation produces ↗Ions which can be measured as electric current between the electrodes.

Germanium (Ge)

A substance used in high-precision ↗Semiconductor Radiation Detectors for ↗Gamma Radiation.

Global Positioning System (GPS)

A constellation of satellites sending microwave signals which enable receivers to determine the time, their location, speed, and direction.

Also known as: Navstar Global Positioning System

GM Tube

↗Geiger–Müller Tube

GMT ↗Greenwich Mean Time

GPS ↗Global Positioning System

Gray (Gy)

The gray is the ↗SI derived unit of ↗Absorbed Dose due to ↗Ionizing Radiation. One gray is the absorption of one joule of energy, in the form of ionizing radiation, by one kilogram of matter.

$$1\,\mathrm{Gy} = 1\,\frac{\mathrm{J}}{\mathrm{kg}} = 1\,\frac{\mathrm{m}^2}{\mathrm{s}^2}$$

For ↗Gamma Radiation, these are the same base units as the ↗Sievert. To avoid confusion, do no not use J/kg but always Gy for the absorbed dose and Sv for the ↗Equivalent Dose.

Greenwich Mean Time (GMT)

Originally the mean solar time at the Royal Observatory in Greenwich, London. It is commonly but imprecisely used synonymously with ↗Coordinated Universal Time when referring to time zones.

Gy ↗Gray

Half Life

The duration it takes for a substance undergoing ↗Decay to decrease by half.

HAZMAT, Hazmat, HazMat

Hazardous materials and items, dangerous goods.

^{3}He Detector

A device to detect thermal ↗Neutrons (↗Neutron Detection) consisting of a tube filled with ^{3}He and other gases under high pressure in a strong electric field. Incident neutrons react with the helium yielding an electrical charge in the gas which can be detected similar as in a ↗Geiger–Müller Tube.

HPGe

High-Purity ↗Germanium.

HPRDS

Human Portable Radiation Detection System

HTTP

↗Hypertext Transfer Protocol

Hypertext Transfer Protocol (HTTP)

A networking protocol for distributed, collaborative, hypermedia information systems, essential for data communication in the World Wide Web.

IANA

↗Internet Assigned Numbers Authority

International Organization for Standardization

↗ISO

International System of Units

↗SI

Internet Assigned Numbers Authority (IANA)

An organization responsible for the allocation of globally-unique names and numbers that are used in Internet protocols.

Internet Protocol (IP)

A protocol used for data communication between devices in a network.

Intrinsic Activity

The inner ↗Activity of a radiation instrument, without contribution from the environment or other sources.

Ion A ↗Nucleus whose number of ↗Electrons differs from the number of ↗Protons resulting in a net negative or positive electric charge.

Ionizing Radiation

↗Particle Radiation or ↗Electromagnetic Radiation energetic enough to detach ↗Electrons from atoms or molecules, thus converting them to ↗Ions.

Ionization depends on the energy of radiation, not on the number of particles or the wavelength. Roughly speaking, particles or photons with energies above a few ↗Electron Volts are ionizing.

Figure 243. Ionizing radiation warning symbol (ISO 21482)

Ionizing Radiation can cause serious damage when absorbed by living tissue, and is therefore a health hazard.

IP ↗Internet Protocol

IP Address

A unique numerical label that is assigned to devices participating in an ↗Internet Protocol-based computer network. Usually it is a 32-bit number written in four 8-bit bytes, for example `192.168.10.199`. It is used to identify hosts or network interfaces and to address locations.

IrOBEX

↗OBject EXchange

ISO (International Organization for Standardization)

The world's largest developer and publisher of International Standards. ISO is a network of the national standards institutes of countries around the world.

Isobar

Different ↗Nuclides having the same ↗Mass Number, for example $^{40}_{18}$Ar and $^{40}_{19}$K or $^{72}_{36}$Kr and $^{72}_{34}$Se.

Isomer

An excited state in a ↗Nucleus having a very long ↗Half Life compared to other excited states: at least a µs or ms. Some isomers expose a much longer half life so they are called metastable (m), for example ^{99m}Tc with a half life of about 6 h.

Isotone

Different ↗Nuclides having the same number of ↗Neutrons, for example $^{36}_{16}$S, $^{38}_{18}$Ar, $^{39}_{19}$K, and $^{40}_{20}$Ca with 20 neutrons each but a different ↗Atomic Number.

Isotope

Different ↗Nuclides having the same number of ↗Protons (also known as ↗Atomic Number) belonging to the same chemical ↗Element, for example $^{234}_{92}$U, $^{235}_{92}$U and $^{238}_{92}$U.

J ↗Joule

Joule (J)

The ↗SI derived unit of energy (↗Electron Volt). It is the energy required to apply a force of one newton through a distance of one meter (1 N·m) or the work required to produce one watt of power for one second (1 W·s).

$$1\,\mathrm{J} = 1\,\mathrm{N}\cdot\mathrm{m} = 1\,\frac{\mathrm{kg}\cdot\mathrm{m}}{\mathrm{s}^2}\cdot\mathrm{m} = 1\,\mathrm{W}\cdot\mathrm{s}$$

KCl ↗Potassium Chloride

$LaBr_3$

↗Lanthanum Bromide

Lanthanum Bromide ($LaBr_3$)

Substance to build ↗Scintillation Counters.

LED Light Emitting Diode

LED Stabilization

Method to adjust for the drift of a ↗Photo Multiplier Tube by measuring the light of a known reference ↗LED.

Linearization

Measurements relying on ↗Scintillation require ways to transfer and amplify light. This is typically done by using a crystal mounted to a ↗Photo Multiplier Tube. Unfortunately, the physics of this assembly introduces a non-proportionality between the input gamma ray energies and the processed electronic output signals. For high precision spectroscopy applications it is therefore inevitable to carefully gauge the assembly to map the non-proportional deviating energies on to the correct incident values. This process is referred to as Linearization.

Live Time (LT)

A detection system is able to record events during the live time, that is, while not being busy processing events in the ↗Dead Time (cf ↗Real Time).

Local Maximum

↗Peak

Low Self-Discharge Nickel-Metal Hydride (LSD NiMH)

The type of rechargeable batteries built into the FLIR powerPACK ultra.

LSD NiMH

↗Low Self-Discharge Nickel-Metal Hydride

LT ↗Live Time

MAC Address

↗Media Access Control Address

Mass Number (A)

The total number of ↗Protons and ↗Neutrons (together known as ↗Nucleons) in an atomic ↗Nucleus.

Also known as: Atomic Mass Number, Nucleon Number

MCS ↗Multi Channel Scaling

Media Access Control Address (MAC Address)

A unique identifier assigned to most network adapters or network interface cards by the manufacturer for identification in a network.

Metric Prefixes

↗Unit Prefixes

Military Time

↗24-Hour Clock

Moderator

A medium with a high content of hydrogen (e.g. ↗Polyethylene) reducing the speed of fast ↗Neutrons, thus turning them into thermal neutrons. Used for example, to enhance ↗Neutron Detection sensitivity for systems which can detect thermal neutrons only.

Multi Channel Scaling (MCS)

An acquisition mode for discrete ↗Spectra. All counts N registered during a period Δt are stored in one channel. After that period, all counts are stored in the next channel, and so on (Figure 244, p. 280).

N42 ↗ANSI N42.42

`*.n42`

Common file name suffix for ↗ANSI N42.42 files.

NaI ↗Sodium Iodide

Naturally Occurring Radioactive Material (NORM)

↗Radionuclides occurring in the Earth lithosphere or atmosphere, for example, potassium, uranium and their daughter products.

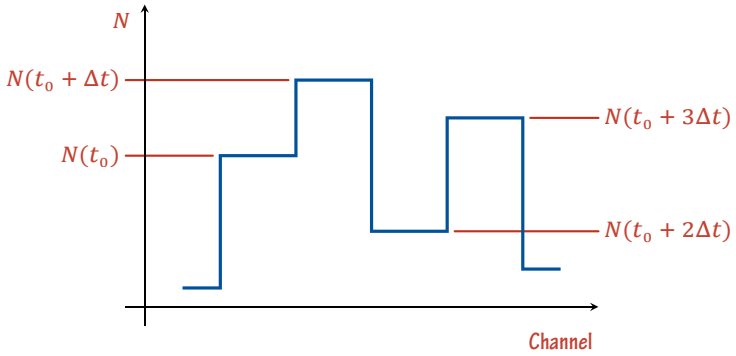

Figure 244. Multi Channel Scaling

Navstar Global Positioning System

↗Global Positioning System

Neutron

A subatomic particle with no electric charge, usually found in the ↗Nucleus of atoms. Neutrons bound in nuclei are stable, free neutrons, however, undergo beta ↗Decay with a mean lifetime of about 12 minutes. Free Neutrons having different energies are categorized by the ↗Neutron Temperature.

Neutron Detection

Thermal neutrons (↗Neutron Temperature) can be detected by observing their interaction with ↗Nuclei like ^{3}He (↗^{3}He Detector), ^{6}Li, ^{10}B, or ^{157}Gd. These interactions produce ↗Particle Radiation or ↗Gamma Radiation which is subsequently detected. To detect fast neutrons (↗Neutron Temperature), a ↗Moderator must be applied.

Neutron Temperature

An energy scale for free ↗Neutrons. The most important categories are fast neutrons, having an energy substantially above 1 eV, slow Neutrons, with an energy below 0.4 eV and thermal neutrons yielding an energy about 0.025 eV. Fast neutrons are deccelerated or thermalized by a ↗Moderator.

Nickel-Metal Hydride (NiMH)

The type of rechargeable batteries built into the FLIR powerPACK plus.

NID Nuclide Identification

NiMH

↗Nickel-Metal Hydride

NORM

↗Naturally Occurring Radioactive Material

Nuclear Fission

↗Fission

Nuclear Fusion

↗Fusion

Nucleon

Collective name for ↗Neutrons and ↗Protons, two subatomic particles building an atomic ↗Nucleus.

Nucleon Number

↗Mass Number

Nucleus

The nucleus is a component of an ↗Atom, carrying the majority of the net mass and an electric charge that is equal to the charge of all ↗Electrons that orbit the nucleus. A nucleus consists of ↗Neutrons and ↗Protons, which are therefore also called ↗Nucleons.

Nuclide

A nuclide is a ↗Nucleus with a specified number of protons and neutrons, that is, having specific nuclear properties.

Nuclides are specified by the name of the chemical ↗Element which implies the ↗Atomic Number and the ↗Mass Number, for example, $^{40}_{18}$Ar or $^{40}_{19}$K. Where sub- and superscripting are not possible or too challenging, nuclides are often written as Ar-40 or K-40.

OBEX

↗OBject EXchange

OBject EXchange (OBEX)

A communications protocol for the exchange of binary objects between devices. It is maintained by the Infrared Data Association but has also been adopted by the Bluetooth Special Interest Group and the SyncML wing of the Open Mobile Alliance.

Also known as: IrOBEX

Pairing

A mechanism to establish a trusted connection between two devices communicating via Bluetooth requiring user interaction only during the first connection of two particular devices.

PAN ↗Personal Area Networking

Particle Radiation

A type of ↗Radiation, whose emission components carry a finite rest mass. ↗Alpha Radiation and ↗Beta Radiation are examples for Particle Radiation.

PE ↗Polyethylene

Peak The place where a function or a measurement (or a graphic rendering thereof) is higher than in the close vicinity (Figure 242, p. 274).

Also known as: Local Maximum

Personal Area Networking (PAN)

A ↗Bluetooth communications profile to connect a small number of devices over usually short distances.

Also known as: Piconet

PHA ↗Pulse Height Analyzer

Photo Multiplier Tube (PMT)

An extremely sensitive light detector used, for example, in conjunction with a ↗Scintillator to register ↗Ionizing Radiation.

Piconet

↗Personal Area Networking

PIN Personal Identification Number

PMMA

↗Polymethyl Methacrylate

PMT ↗Photo Multiplier Tube

Polyethene

↗Polyethylene

Polyethylene (PE, $(C_2H_4)_n$)

A substance usable as ↗Moderator for fast ↗Neutrons.

Also known as: Polyethene, Polymethylene, Polythene

Polymethyl Methacrylate (PMMA, $(C_5H_8O_2)_n$)

A substance usable as ↗Moderator for fast ↗Neutrons.

Also known as: Acrylic Glass

Polymethylene

↗Polyethylene

Polythene

↗Polyethylene

Positron

A subatomic particle with a positive electric charge, counterpart of the ↗Electron. It is emitted as ↗Beta Radiation.

Potassium Chloride (KCl)

A salt containing natural ^{40}K used to calibrate radiation detection systems.

Proton

A subatomic particle with a positive electric charge. It builds the ↗Nucleus of each atom, along with ↗Neutrons. A proton is also stable by itself and has a second identity as the hydrogen ↗Ion, H^+.

Proton Number

↗Atomic Number

Pulse Height Analyzer (PHA)

An instrument which accepts electronic pulses of varying heights from particle and event detectors, digitizes the pulses' heights, and saves them in channels for spectral analysis.

Radiation

The propagation of energetic particles (↗Particle Radiation) or electromagnetic waves (↗Electromagnetic Radiation) through a medium or space. Examples are ↗Alpha Radiation, ↗Beta Radiation, ↗Gamma Radiation, ↗Neutrons but also X-rays, radio waves, light, microwaves or heat.

The word "Radiation" commonly is used as an abbreviation for ↗Ionizing Radiation.

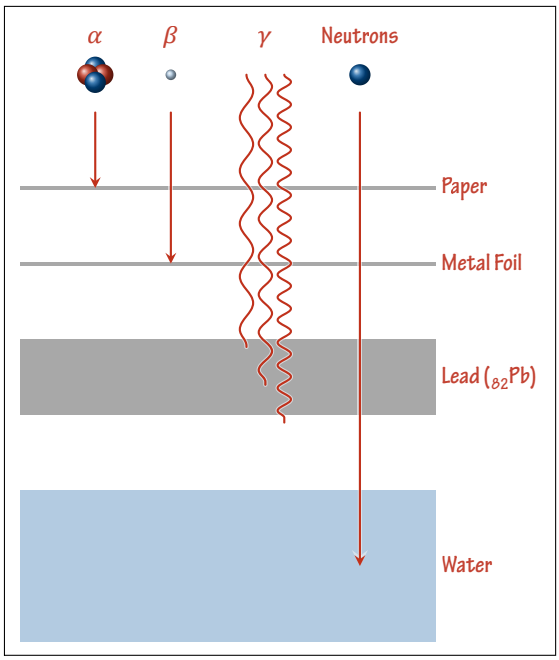

Figure 245. Shielding of ionizing radiation (not to scale)

Radio Time

↗24-Hour Clock

Radioactive Decay

↗Decay

Radiological Dispersal Device

↗Radiological Dispersion Device

Radiological Dispersion Device (RDD)

A weapon designed to spread radioactive material with the intent to kill or cause disruption.

Also known as: Radiological Dispersal Device, Dirty Bomb

Radionuclide

A radioactive ↗Nuclide.

Railway Time

↗24-Hour Clock

RDD ↗Radiological Dispersion Device

Reachback

The process of transmitting information from a field deployed instrument to a lab or other facility for further analysis.

Reactor-Grade Plutonium (RGPu)

Reactor-Grade Plutonium is a special mixture of ^{239}Pu, ^{240}Pu and other ↗Isotopes, which contains ≥19 % ^{240}Pu. ^{240}Pu has a high rate of spontaneous fission leading to an increased number of ↗Neutrons and bears the risk of premature starting chain reactions. Further grades are ↗Fuel-Grade Plutonium and ↗Weapons-Grade Plutonium.

Real Time (RT)

The real or total time of a detection system comprises the ↗Live Time and the ↗Dead Time.

Also known as: Total Time, True Time

Region of Interest (ROI)

A selected subset of samples within a ↗Spectrum identified for a particular purpose.

rem ↗Röntgen Equivalent in Man

Remote Network Driver Interface Specification (RNDIS)

A Microsoft-proprietary protocol providing a virtual Ethernet connection used mostly via ↗USB.

Resolution

In spectroscopical application, the resolution gives a useful measure to estimate how well two or more ↗Peaks can be distinguished. It is consequently defined as the width of a peak – usually the most prominent line at 661.65 keV of ^{137}Cs. Because there are various ways to judge a peak width, it is a convention to use the ↗Full Width at Half Maximum.

RGPu

↗Reactor-Grade Plutonium

RID ↗Radionuclide Identifying Device

RNDIS

↗Remote Network Driver Interface Specification

ROI ↗Region of Interest

Röntgen Equivalent in Man (rem)

The röntgen equivalent in man is an old unit of radiation ↗Dose. (↗Sievert)

$$100\ \text{rem} = 1\ \text{Sv}$$

The continued use of rem is "strongly discouraged" by the U.S. National Institute of Standards and Technology.

RT ↗Real Time

Scintillation Counter

A device to measure ↗Ionizing Radiation by amplifying the light emitted from a ↗Scintillator with a ↗Photo Multiplier Tube and quantifying the result.

Scintillator

A material emitting a flash of light when it absorbs ↗Ionizing Radiation.

Semiconductor Radiation Detector

A semiconductor (for example ↗Germanium or ↗Cadmium Zinc Telluride) placed between two electrodes registering electric pulses resulting from the travel of free electrons produced by incident ↗Gamma Radiation. The number of free electrons is proportional to the radiation's energy.

SI (*Système International d'Unités*)

A metric and decimal system of units, standardized by the *Bureau International des Poids et Mesures* (International Bureau of Weights and Measures).

Also known as: International System of Units

SI Prefixes

↗Unit Prefixes

Sievert (Sv)

The ↗SI derived unit of dose equivalent. It attempts to reflect the biological effects of ↗Ionizing Radiation as opposed to the physical aspects, which are characterized by the ↗Absorbed Dose (↗Gray).

$$1\ \text{Sv} = 1\ \frac{\text{J}}{\text{kg}} = 1\ \frac{\text{m}^2}{\text{s}^2}$$

For ↗Gamma Radiation, these are the same base units as the ↗Gray. To avoid confusion, do not use J/kg but always Gy for the absorbed dose and Sv for the dose equivalent.

SIM Subscriber Identity Module, used for example in mobile phones.

Sodium Iodide (NaI)

Substance to build ↗Scintillation Counters.

SOP ↗Standard Operating Procedure

Source Stabilization

Method to continuously adjust for the drift of a detection system by measuring the radiation of a known reference source.

`*.spc`

A file format used by former measuring instruments to store spectrum data. Was replaced by the more versatile and standardized ↗ANSI N42.42 format.

Specific Activity

The ↗Activity in ↗Becquerel per amount of substance. The amount is usually given as mass for solid matter (Bq/kg, "specific activity" sensu stricto) or as volume for liquids (Bq/l, activity concentration).

Also known as: Activity Concentration

Spectrum

The continuous arrangement of the components of ↗Radiation in a progressive series according to a characteristic quantity such as wavelength, frequency, energy, charge, mass etc. Using this arrangement as one axis, another quantity, e.g. intensity, can be plotted along a perpendicular axis

Digital spectra are discrete, that is they collect the plotted quantity into separate channels representing a (small) range of the characteristic quantity.

Standard Operating Procedure (SOP)

A set of instructions for a procedure to be executed always in exactly the same manner.

Also known as: Standing Operating Procedure

Standing Operating Procedure

↗Standard Operating Procedure

Sv ↗Sievert

Système International d'Unités

↗SI

Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)

↗Naturally Occurring Radioactive Material as used in, for example, oil and gas exploration, development and production operations.

TENORM

↗Technologically Enhanced Naturally Occurring Radioactive Material

Tethering

Using a mobile device such as a mobile phone to supply Internet access for another device which is otherwise unconnected, using the mobile device as a modem. This can be done through, for example, ↗Bluetooth wireless technology or cables (such as ↗USB).

Thermal Neutron

↗Neutron Temperature

Total Time

↗Real Time

Trickle Charging

Charging a battery to balance its intrinsic self discharge thus maintaining the full capacity of the battery.

True Time

↗Real Time

Uniform Resource Identifier (URI)

A string of characters used to identify a name or a resource on the Internet.

Unit Prefixes

Prefixes for ↗SI units (Table 4, p. 287)

Table 4. Prefixes for units according to the *Système International d'Unités* (International System of Units)

	Prefix	Symbol	Decimal
10^{24}	yotta	Y	1 000 000 000 000 000 000 000 000
10^{21}	zetta	Z	1 000 000 000 000 000 000 000
10^{18}	exa	E	1 000 000 000 000 000 000
10^{15}	peta	P	1 000 000 000 000 000
10^{12}	tera	T	1 000 000 000 000
10^{9}	giga	G	1 000 000 000
10^{6}	mega	M	1 000 000
10^{3}	kilo	k	1 000
10^{2}	hecto	h	100
10^{1}	deca	da	10
10^{0}			1
10^{-1}	deci	d	0.1
10^{-2}	centi	c	0.01
10^{-3}	milli	m	0.001
10^{-6}	micro	µ	0.000 001
10^{-9}	nano	n	0.000 000 001
10^{-12}	pico	p	0.000 000 000 001
10^{-15}	femto	f	0.000 000 000 000 001
10^{-18}	atto	a	0.000 000 000 000 000 001
10^{-21}	zepto	z	0.000 000 000 000 000 000 001
10^{-24}	yocto	y	0.000 000 000 000 000 000 000 001

Also known as: Metric Prefixes, SI Prefixes

Units of Time

The ↗SI base unit for time is the second. It may be prefixed with the usual SI ↗Unit Prefixes to express smaller or larger quantities.

Units known from everyday life (Table 5, p. 288) are often used for larger quantities.

Table 5. Units of time

Unit	Symbol	Relation
Second	sec, s	
Minute	min, m	60 sec
Hour	h	60 min
Day	d	24 h
Year	a	365.25 d

The Year is often prefixed (see Table 4, p. 287) to express very large quantities like 1.3 Ga for 1.3 billion years (the ↗Half Life of ^{40}K).

Universal Serial Bus

↗USB

URI ↗Uniform Resource Identifier

USB (Universal Serial Bus)

A specification to establish communication between various types of devices and a host controller, usually a personal computer.

UTC ↗Coordinated Universal Time

Weapons-Grade Plutonium (WGPu)

A mixture of ^{239}Pu, ^{240}Pu and other ↗Isotopes, which contains less than 7 % ^{240}Pu. Due to its reduced amount of the spontaneous fission source ^{240}Pu, the risk of a premature chain reaction start is decreased so that this blend of Plutonium is used for the weapon head assemblies. Further grades are ↗Fuel-Grade Plutonium and ↗Reactor-Grade Plutonium.

WGPu

↗Weapons-Grade Plutonium

WGS84

↗World Geodetic System

World Geodetic System (WGS84)

A standard for use in cartography, geodesy, and navigation comprising a coordinate system for the Earth, a reference surface for raw altitude data, and a geoid defining the nominal sea level.

The WGS release of 1984 with later revisions is used by ↗Global Positioning System.

XML (Extensible Markup Language)

A gratis open standard for encoding arbitrary data with their structure in textual files.

Z ↗Atomic Number

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Europe, Africa, Middle East

FLIR Detection, Inc.

Luxemburgstraat 2
2321 Meer
Belgium

☎ + 32 (0) 3665.5106
🖷 + 32 (0) 3303.5624

Americas

FLIR Detection, Inc.

100 Midland Road
Oak Ridge, TN 37830
USA

☎ + 1.865.220.8700
🖷 + 1.865.220.7181

Asia Pacific

FLIR Detection, Inc.

3 Pickering Street #03-49
Nankin Row
Singapore 048660

☎ + 65.6822.1595

✉ radiation.support@flir.com
🌍 detectionsupport.com/radiation/

www.flir.com